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COMPUTERWORLD

INSIDE

NEWSPAPER

Sun unit sears mini market at 10 MIPS

BY ROSEMARY HAMILTON
and ALAN ALPER
CW STAFF

NEW YORK — Sun Microsystems, Inc. set a new performance standard in the workstation market last week with the introduction of a 10-million-instructions-per-second machine offering power comparable to a Digital Equipment Corp. VAX 8800 — at one-tenth the price.

The Sun-4/200 series, with starting prices of $39,900, effectively offers double the performance of major competitors' products and is positioned to take on minicomputer offerings that now serve as engineering hosts, analysts said.

"This puts [Sun] in a very strong position to replace minicomputers in an engineering environment," said Robert Herwick, senior technology analyst with Hambrecht & Quist, Inc. in San Francisco. "They are offering a strong economic incentive to switch over."

An entry-level Sun-4/260 workstation, which is a desk-side, diskless model, comes with 8M bytes of main memory and a 19-in. high-resolution monochrome monitor. A desk-side model with 32M bytes of main memory, a color monitor with resolution of 1,152 by 900 pixels, a 560M-byte disk subsystem and a 69M-byte ¼-in. tape cartridge is priced at $85,500.

Server configurations range from $36,900 for a pedestal model with 8M bytes of main memory to $199,900 for a high-end server with 2.3G bytes of disk storage, 128M bytes of main memory and a ½-in. tape drive. They support up to 25 workstations or 50 terminals.

A DEC VAX 8800 with 32M bytes of memory and no disk or tape drives lists for $650,000.

Continued on page 6

New home for Nomad

Users hope Thomson will halt D&B neglect

BY ALAN ALPER
CW STAFF

WILTON, Conn. — D&B Computing Services sold its Nomad line last week to Thomson SA, the French aerospace and electronics firm, in a move users hope will stem three years of declining support for the products.

Both companies declined to say how much Thomson paid for the Nomad line of fourth-generation language productivity tools, which was reported to have been for sale [CW, May 25]. Sources familiar with the negotiations said Thomson paid between $15 million and $20 million for Nomad technology, documentation and the physical assets required to support and enhance the product line.

Continued on page 4

Borland to buy Ansa

Deal draws bead on Dbase dominance

BY DOUGLAS BARNEY
CW STAFF

BELMONT, Calif. — Hoping to knock Ashton-Tate from its pinnacle atop the microcomputer data base market, Borland International last week agreed to acquire Paradox data base vendor Ansa Software in a stock swap valued at $38 million.

The entry of Borland into the microcomputer relational data base market will heat up competition dramatically, some observers said. Borland, which made its mark with low-priced accessory and language PC software, is an aggressive and innovative marketing firm with more than one million users.

Borland said that in addition to a marketing boost, it intends to use its existing product line to beef up Paradox and hopes to break the near stranglehold Ashton-Tate has on the market with its Dbase products. Unlike other Borland products, Paradox is expected to remain relatively high priced, at $495.

Borland's Turbo line of language products is to be adapted to serve as a set of development tools for Paradox, which already includes PAL, a built-in data base language. Borland will also rework Reflex, an analytical file manager, to serve as a front end to Paradox.

One-hit wonders?

Ansa was one of three companies to surface in 1985 and be anointed by some analysts as possibly the next firms to follow the path of Lotus Development Corp. But Ansa, Javelin Software Corp. and Symantec Corp. are all currently revising their strategies as the prospect of another one-product success story proves increasingly elusive (see story page 117).

Under terms of the proposed acquisition, Ansa will operate as a subsidiary of Borland. The two firms will develop products jointly and combine their sales forces. "We are in a much stronger position to compete against Ashton-Tate, and we will be doing so in a very aggressive manner," said Ronald S. Posner, president of Ansa and a former high-ranking Ashton-Tate executive. Posner will remain president of Ansa.

Ashton-Tate Chairman Edward M. Esber Jr. shrugged off the notion that Dbase is threatened by Paradox. "Ansa wasn't a big threat then and isn't a big

Continued on page 117

Ashton-Tate eyes low-end publishing

BY DOUGLAS BARNEY
CW STAFF

TORRANCE, Calif. — Ashton-Tate should make its expected move into the desktop publishing market by early August with a $395 package aimed at occasional desktop publishing users.

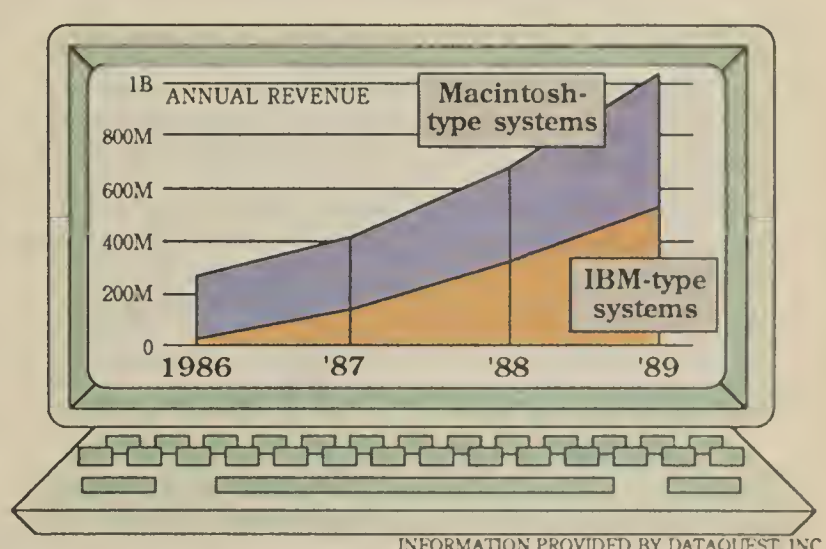
The firm, which currently has no desktop publishing offering, will avoid head-to-head competition with companies such as Aldus Corp. and Xerox Corp., which sell high-end packages that require full-featured microcomputers. Instead, Ashton-Tate said recently it has targeted the broader market of personal computer users interested in sprucing up spreadsheet, data base or word processing output.

Ashton-Tate's Byline was designed to run on Intel Corp. 8088-based monochrome systems with low-level graphics capabilities. The package does not use a mouse or require a hard disk drive and needs only 384K bytes of random-access memory, according to sources familiar with the product. Byline can reportedly create output using conventional dot matrix and daisywheel printers.

In contrast, most high-level desktop publishing packages require a mouse, high-resolution

Continued on page 118

Printing money
Ashton-Tate hopes to earn a share of the desktop publishing market, which is projected to grow rapidly



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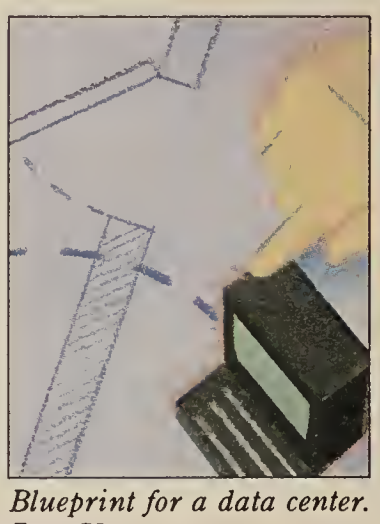
CW CHART: MITCHELL J. HAYES

IN THIS ISSUE

OS/2 in '88. Compaq President Rod Canion stresses his firm's support of MS OS/2, which he claims will run better on Compaq machines than on PS/2s. Compaq will offer the operating system on its micros in 1988, he says. Page 7.

Long way to go. Independent tests show IBM's PC Network Version 1.2 offers improvements in limited areas and only for certain applications. Page 8.



Blueprint for a data center. Page 53.

Quotable

"We were distressed by a very healthy product being hampered by a weakened company."

LLOYD ERICKSON
PRESIDENT
OASIS, A NOMAD USERS GROUP

See story page 1.

Cullinet cashing in on banking tool market

BY JEAN S. BOZMAN
and ROSEMARY HAMILTON
CW STAFF

Cullinet Software, Inc. will take a shot at the highly competitive banking software market this week as it ships beta-test versions of its banking system to three major financial institutions.

The Cullinet banking system is said to run under IBM's MVS, MVS/XA and OS/VS operating systems in conjunction with Cullinet's IDMS/R data base. The modules will later be ported to IBM's DOS/VSE environment, Cullinet officials said last week.

Following about nine months of testing with Cullinet technicians present at each of the three beta-test sites, general shipments should begin sometime next year. However, Cullinet would not estimate a general availability date.

'Spectacular failures'

"This is a field with spectacular failures and false promises," said Charles Frumberg, an analyst with Mabon, Nugent & Co. Cullinet "will meet real skeptical buyers. In short, they simply have to deliver."

Cullinet would not provide an official general shipment date for the new system, and analysts said they do not expect the system to be commercially available until late 1988.

"I expect it to be beta tested for a long time," said Stephen McClellan, a vice-president at Merrill Lynch & Co. "They have wisely not stated a delivery date, and they have plenty of time because no one else has really produced a full-fledged integrated package."

Delivery dates are a sticky issue in the banking software market. Dallas-based Hogan Systems, Inc. met delivery dates in the early 1980s, but with incomplete products that sent it into financial chaos. Uccel Corp. missed a promised delivery date last month of its banking software that left more than 40 committed customers in the lurch.

Cullinet's banking products attempt to address five major areas: customer profile, asset tracking, liabilities tracking, portfolio management and interfaces with electronic banking terminals. Cullinet claimed any IBM-compatible terminal user will be able to build applications through an interactive selection process.

Through a series of preprogrammed screens and menus, the banking modules were designed to be used by banking managers, as well as by MIS staff programmers. "The intention is not to involve MIS, since that tends to be where the bottleneck is in applications development," said David Iacino, senior product manager for banking at Cullinet's Westwood, Mass., headquarters.

The price tag for each of the five components will be $450,000 for users who have IDMS/R. The entire system — including the IDMS/R data base management system — is priced at about $2 million.

Cullinet executives seem confident about their pricing schedule. "Banking customers have told us they can justify the products' cost in terms of increased productivity and an ability to reach the market quickly with new banking services," said Louis J. Muggeo, director of Cullinet's Banking Product Group.

This week's shipments mark the final phase of development for a suite of banking packages generated under Cullinet's AD-S/Online and IDMS/R. A team of 18 programmers, half of them formerly from Bob White Computing and Software, Inc. in Oak Brook, Ill., wrote the two million lines of code that compose the mainframe-oriented banking package.

Bob White Computing was acquired in a takeover in 1984 and was renamed Cullinet-BWCS.

Hatching plans with DEC

WESTWOOD, Mass. — After having confirmed last month that it was cooking up a formal relationship with Digital Equipment Corp., Cullinet Software, Inc. went public with its plans last week, announcing that the two vendors have forged a "feasibility study" agreement.

Neither vendor would explain what such an agreement entails.

"Now we're putting our heads together with DEC," a Cullinet spokesman said.

DEC recently proposed a similar agreement to Management Science America, Inc. (MSA), according to Dennis Vohs, president of MSA's manufacturing division. MSA declined, he said, because discussions were already under way, and MSA saw no reason to formalize such a process.

ROSEMARY HAMILTON

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— Ken Daly, Director,
Management Information Services
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Nomad

FROM PAGE 1

The acquisition of Nomad by Thomson is expected to end three years of D&B Computing's benign neglect for the product line, customers said last week. During that time, D&B Computing reduced its Nomad sales force, cut back consulting and education efforts and lowered its level of support, according to Lloyd Erickson, president of the Oasis users group and an electronics engineer at the National Aeronautics and Space Administration.

"We were distressed by a very healthy product being hampered by a weakened company," he said.

The Nomad family will be marketed and supported by Must Software International, Inc., a new organization Thomson has established for the development and worldwide marketing of productivity software. Must International will continue to be headquartered in Wilton and operate as part of U3S International, Ltd., a Thomson software affiliate based in Paris. Must International is headed by Jean Luc Badault, president of the U3S group of companies.

As expected, D&B Computing retains its time-sharing and computer maintenance operations, which will continue under President David Fehr, who is also a senior vice-president of the firm's parent company, Dun & Bradstreet Corp. Those operations contributed approximately half of D&B Computing's $40 million in revenue last year, sources said.

Sources familiar with D&B Computing's reasoning said it sold Nomad because the line no longer fit in with its information services strategy and had not met corporate financial objectives. The centerpiece of the product line is Nomad2, a fourth-generation language data base management system used primarily in IBM mainframe environments that is installed in about 500 information and applications development centers worldwide and has a user base of more than 100,000.

Frank Sowinski, vice-president of finance at D&B Computing, said the decision to sell Nomad resulted more from Thomson's interest in the product line than from his corporation's desire to sell it. "It was a situation that created a solid home for the product and a solid future for employees and the customer base," he said.

Frank Fish, executive vice-president of the U3S group and general manager of Must International's North American and Pacific operations, said his firm intends to further enhance Nomad and provide increased support, consulting and training services.

U3S International's Princeton, N.J., development lab has engineered a number of enhancements for Nomad, he said, including a user interface that is easier to use, a more powerful distributed facility for the Nomad2 DBMS and more seamless integration between procedural and nonprocedural code.

"We're going to make the product easier to learn," Fish added.

PC Nomad porting plans

Must International also plans to enhance PC Nomad, the implementation of Nomad2 for personal computers, and is considering porting the relational DBMS to a variety of minicomputer environments, including Digital Equipment Corp.'s VAX VMS, he added.

Fish said Must International is considering acquiring products from other U.S.-based software companies to accomplish many of its goals. "As time goes on, we will acquire products that are synergistic with Nomad," he said. He declined to provide specifics.

Some observers said they are fearful that, with control of the Nomad line essentially in the hands of an overseas company, Must International may lose sight of domestic user requirements. Fish said such criticism is unjustified, noting that more than 90% of D&B Computing's Nomad personnel have agreed to join Must International.

Don Weimann, a staff systems analyst with Chevron Information Technology, the MIS unit of Chevron Corp. — one of the largest Nomad users — said he is encouraged by Thomson's plans for the product line. "We're pleased that Nomad2 will stay as an entity and was not sold to a big existing software company and carved up," he said.

NASA's Erickson said that since Thomson is a $9 billion firm with an engineering bent, it may be more inclined to invest in research and development than D&B Computing. "D&B is primarily an information company; they make money selling information, not software," he pointed out. "Anytime anyone needed resources in that corporation, it was the information side of the house that got it."

Analysts, however, said that as part of Thomson, Nomad might get even less attention than it received from D&B Computing, which is a smaller firm.

Thomson also recently initiated the "Must Project" to develop software products for the 1990s. The project's aim is to develop software to help facilitate the extraction of text, data and images from corporate data bases by ever-proliferating numbers of desktop and departmental computers, Fish said.

The Nomad line of productivity tools will become the foundation of the Must Project, Fish said.

At a glance

Thomson SA

Headquartered in Paris, Thomson is a $9 billion multinational electronics and aerospace company

Software revenue:
$60 million in 1986 (estimate), Nomad estimated at $20 million last year.

Two software affiliates:

- United Software Systems & Services International, Ltd. (U3S), which will manage Must Software International as provider of Nomad.
- Syseca, considered the seventh largest French software concern; best known for its CLIO data base management system, which is installed at some 650 sites primarily in Europe. CLIO runs over multiple hardware environments but is optimized for minicomputers. The firm also does consulting and develops real-time computer and communications applications for a variety of commercial and government clients. The company employs about 850 people.

CW CHART

M&D not for sale

D&B Computing Services' sale of its Nomad line last week in no way reflects Dun & Bradstreet Corp.'s intentions for its other software units, according to an executive at McCormack & Dodge Corp., Dun & Bradstreet's financial applications software subsidiary.

"This in no way changes Dun & Bradstreet's perspective on us, or Erisco, for that matter," said Robert Kelley, corporate vice-president with responsibility for strategic marketing. Erisco is another Dun & Bradstreet software subsidiary.

Kelley's comments were in response to reports that Dun & Bradstreet is seeking a buyer for M&D because it does not fit the firm's information services thrust. Speculation on M&D was revived during Thomson SA of France's negotiations to acquire Nomad [CW, June 15].

Dun & Bradstreet "looks at us as a growth sector," Kelley noted. "We've achieved better than 30% growth on a revenues basis and have reached our profit goals."

Kelley said the rumors regarding Dun & Bradstreet's intent to sell M&D have their genesis in competition. "When you're part of a large conglomerate, those questions are always raised," he said. "It's mostly market battle stuff; we're used to it."

ALAN ALPER

DG enters AI field via Gold Hill pact

BY CHARLES BABCOCK
CW STAFF

WESTBORO, Mass. — Data General Corp. last week said it has signed an agreement with Gold Hill Computers, Inc. to provide expert system development tools that develop applications capable of accessing mainframe data bases.

The expert systems can be developed on IBM Personal Computers and compatibles and other workstations supported under the DG Personal Computer Integration (PCI) networking scheme, announced June 2.

The Gold Works expert system development tools are available now to work on PCI networks, according to Charles B. Piper, DG's artificial intelligence product marketing manager.

The expert systems will be developed in Golden Common LISP from Gold Hill and will be capable of running on IBM or compatible PCs or a DG Eclipse MV minicomputer. The Eclipse, in turn, can connect to an IBM mainframe through Decision Connection and APIOU 6.2, DG's gateway products to IBM's Systems Network Architecture (SNA). "The customer has the capability of building an expert system on a PC and have it work in association with a LISP application on an MV Eclipse," Piper said.

Gold Works is priced at $7,500 for a single user. A $2,500 communication product, Golden Connection, ties the DG PCI network to the Eclipse MV. The Decision Connection and APIOU 6.2 SNA gateways are priced from $620 to $9,830 and from $525 to $8,360, respectively, based on processor size.

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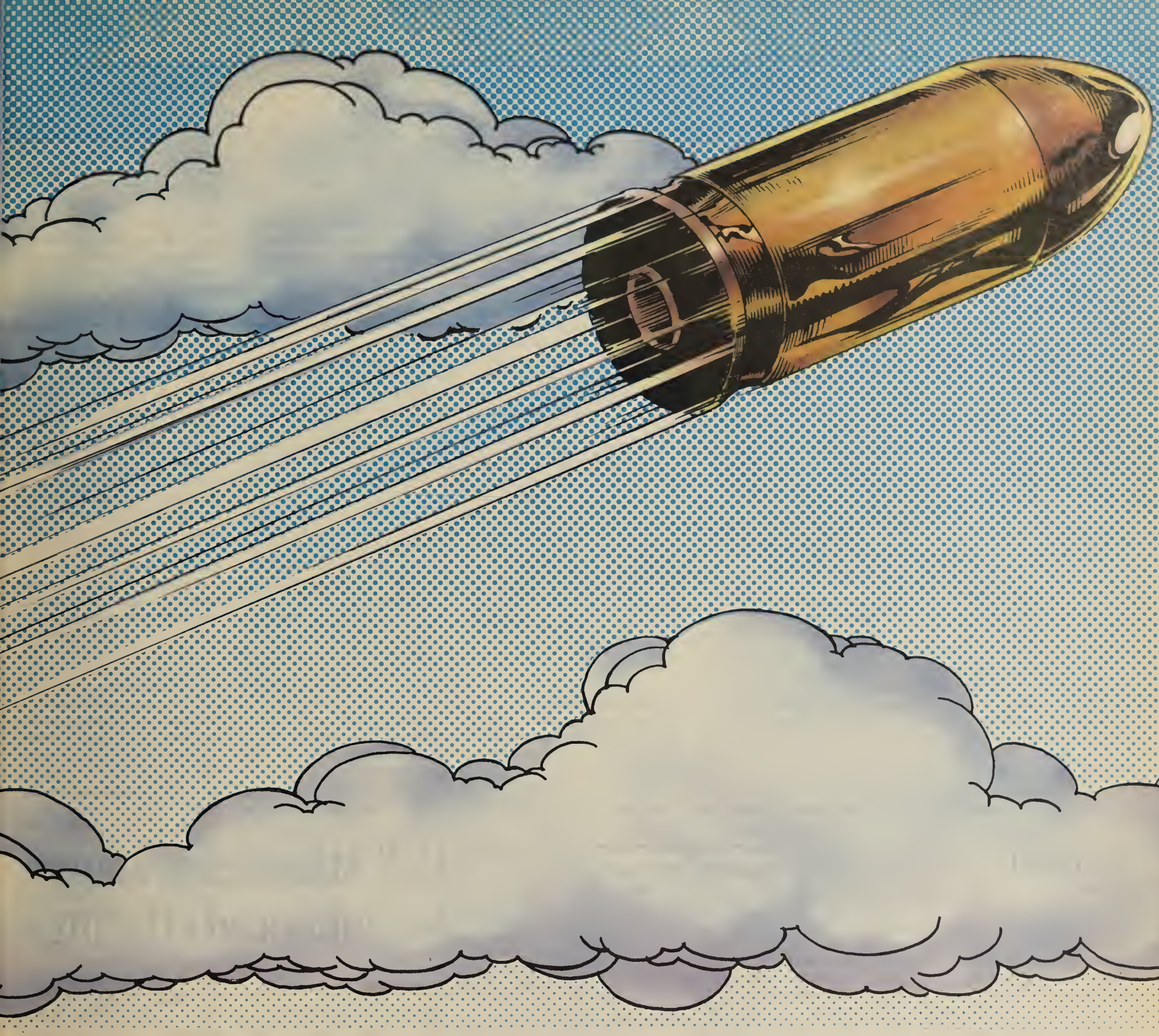

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Oracle racing to OS/2 market

Attempting to beat IBM, Ashton-Tate to the punch with data base support

BY ALAN ALPER
and CHARLES BABCOCK
CW STAFF

NEW YORK — Oracle Corp. is attempting to beat IBM to market with an assembly of products that provide a look-alike version of IBM's OS/2 Extended Edition operating system.

Oracle is hoping the combination, along with a set of tools for developing OS/2 applications, will establish the company in the emerging market for IBM's Personal System/2 computers and wrest part of it away from desktop data base management system giant Ashton-Tate.

Before even the base version of OS/2 is available, IBM Personal Computer XT and AT users will be able to develop OS/2-size applications using a currently available combination of Oracle software and discounted personal computer-insert boards. When the Standard Edition of the operating system becomes available in the first quarter of 1988, the Oracle products will allow PC XT and AT users to run OS/2 with an SQL-based relational data base, similar to what is slated for the Extended Edition version, Wall Street analysts said.

Not sitting still

Ashton-Tate is not sitting still in the face of Oracle's moves. The company has a more powerful version of Dbase under development to run with OS/2, although it has not committed to a delivery date. Conceding that he views Oracle as a serious competitor, Ashton-Tate Chairman Edward M. Esber Jr. claimed his firm has the advantage of knowing how to design end-user interfaces, while Oracle is used to dealing with minicomputer users. IBM has not announced a delivery date for OS/2 Extended Edition, which will include an SQL-based relational DBMS and a communications manager. It has said it will announce availability in the fourth quarter of this year; the operating system is presumed to be at least a year to 15 months away.

Oracle Chairman Lawrence J. Ellison promised at a news conference last week that an OS/2 version of Oracle will be available as soon as Standard Edition OS/2 ships in the first quarter of 1988. If that is true, Oracle will be offering a relational DBMS with communications facilities that resemble — if not match — IBM's Extended Edition product, Wall Street analysts said.

"We can't say they'll be compatible with [IBM's] Extended Edition, but everything they're doing falls within the standards IBM set in Systems Applications Architecture," said Christopher Mortenson, vice-president of Alex Brown & Sons, Inc., a brokerage house in New York.

Both Oracle's Ellison and Ashton-Tate's Esber appeared at a New York press conference convened by Compaq Computer Corp., whose Chief Executive Officer Rod Canion was seeking to dispel what he called "the nagging misconception" that only IBM PS/2s will run the OS/2 operating system (see story page 7).

Show of solidarity

In what was supposed to be a show of solidarity against IBM, Ellison said Oracle was going to become a big player in the microcomputer marketplace, which has long been Ashton-Tate's home turf, while Esber said that the OS/2 version of Dbase would "provide the performance of a minicomputer DBMS," a description that fits Oracle.

The components that Oracle plans to assemble to work with OS/2 Standard Edition include the following:

- An OS/2 version of Oracle, which currently runs on IBM mainframes, Digital Equipment Corp. VAXs, a variety of minicomputers and IBM PCs.
- A discounted version of the Professional Oracle tool kit for developing PC applications under IBM's PC-DOS that exceed the 640K-byte memory limit. Normally priced at $1,295, it is being offered through Aug. 31 at $199.
- In addition to software, Oracle is going into the discounted hardware business by offering OS/2 upgrade kits. For an IBM PC XT, the company will offer a SOTA Technology, Inc. motherboard with an Intel Corp. 80286 processor and 2M bytes of memory. For IBM PC ATs, it will sell an AST Research, Inc. Rampage286 memory board with 1M byte of memory. Normally retailing for $1,495 and $895 respectively, the products will be available through Oracle for $1,199 and $599.
- Oracle will announce next week a look-alike version of IBM's Query Management Facility, to be called QMX. It will allow Oracle users to formulate queries against IBM's DB2 as well as Oracle, company officials said. "Nobody else can allow you to develop large applications. Application developers don't want to continue working under 640K," said Oracle's Vice-President Peter Tierney. "Oracle's moves will appeal to software developers and leading-edge people now. When OS/2 is ready, many of them will say, 'Hey, we've had six months to play with this thing. We think we will go ahead with it.' "

Esber said an OS/2 version of Dbase will include a more powerful data base manager and an Apple Computer, Inc. Macintosh-like graphics interface to end users.

He also said Ashton-Tate plans to offer a data base server that will permit Dbase to become a multiuser system with distributed data base capabilities.

Mortenson said Oracle is already a multiuser, multitasking system with distributed capabilities. "It will be easier for Oracle to develop a friendly, end-user interface than it will be for Ashton-Tate to develop the distributed data base characteristics that a single-user system has never had to address," he predicted.

Sun unit

FROM PAGE 1

In typical configurations, the DEC 8000 series ranges in price from $141,000 to $836,000 and supports from a dozen to several hundred users.

"With the price and performance of this, they could really take some business away from DEC," said Michael Orsak, an analyst with Robertson, Colman & Stephens.

Last week's announcement also marks Sun's first step in its long-intended plan of becoming a broad range computing vendor.

The Sun-4/200 series more than doubles the performance of its current 4 MIPS high-end offering, and the vendor claimed that with the new microprocessor used in this system, it will be able to provide 100 MIPS machines by the early 1990s.

The Sun-4/200 series is based on a reduced instruction set computing (RISC) microprocessor that Sun designed with Fujitsu Microelectronics, Inc. Analysts said it is part of a bigger scheme under way at Sun that involves greatly expanding at the high-end with this technology while also broadening its low-end. The low-end move could involve an Intel Corp. 80386-based machine to be released later this year, analysts speculated.

While the Sun-4/200 series was applauded by many industry observers, some users and analysts raised concerns that the new proprietary system may depart from industry standards, which Sun has always embraced. Its previous machines have been based on Motorola, Inc. 68000-series processors.

Sun claimed the new line is source code compatible with current Sun workstations.

It runs under the Sun version of the Unix operating system, and the vendor said approximately 90 third-party software developers have either already ported or intend to port their software to the new system.

The new workstations are aimed at compute-intensive and floating-point applications. Primary markets include mechanical and electrical computer-aided design and artificial intelligence development.

The workstations were designed around a 32-bit scaleable processor architecture for supercomputing workstations (Sparc), which uses typical RISC features such as single-cycle, simple-format instructions, delayed control transfer and optimizing compilers. Sparc's engine is a full 32-bit microprocessor with gate logic array that reportedly can process 10 MIPS at a clock speed of 16.67 MHz.

Since the new workstations use the same 12-slot backplane as the Sun 3/260, upgrades can be facilitated through a CPU board swap, the firm said. Cost of the upgrade is $13,900.

Sun also reduced prices by 5% to 19% on its Sun-3/200 workstation series. The company also launched what it called its Symbolic Programming Environment, which consists of software development tools for the development of AI applications on Sun workstations.

The repositioned Sun-3/200 workstation line now ranges in price from $28,900 to $36,900. The two 8M-byte servers in the family cost $25,900 and $26,900, respectively. It costs $3,500 and is set to be available on a site license basis.

Sun's 4/200 series

Characteristics of the new high-end system

MIPS[1]	10
Linpack (MFLOPS[2])	1.6 (single precision) 1.1 (double precision)
Spice simulation	19
Dhrystones	19,000 (per second)
Main memory	8M to 128M
Disk storage	280M to 2.3G
Entry price	$39,900

[1] Million instructions per second
[2] Million floating-point operations per second

INFORMATION PROVIDED BY SUN MICROSYSTEMS, INC.
CW CHART

Bell Atlantic revamps for enhanced offerings

BY ELISABETH HORWITT
CW STAFF

Aiming to get in shape for expansion into enhanced services and new business ventures, Bell Atlantic Corp. plans a major restructuring effort during the next six months.

The plan is to consolidate under one administration Bell Atlantic's divested Bell operating companies and their operating staffs; customer services, financial services and cellular services; and a newly formed Enterprises Information Group. The new group will manage new strategic initiatives and other lines of business, the company said in a recent internal announcement. All of these groups will report to a chief operating officer, as yet unappointed, who will be responsible for integrating and coordinating these operations.

The reorganization is being made "in response to and anticipation of changes we see happening in the regulatory and competitive environments," said Bell Atlantic spokesman Tom Healey. "It will allow us to provide new offerings and integrate them more easily."

Previously, the Bell operating companies formed a separate Network Services Group, while a separate division, Network Services, Inc., included the administrative staff. A third group, Enterprises Corp., was responsible for new business ventures.

Reduces costs

The consolidation of these groups will allow Bell Atlantic to both reduce costs by removing duplication of personnel and trimming organizational overhead and provide integration of resources for the regional Bell holding company's future efforts to expand into new marketplaces, according to Thomas E. Bolger, Bell Atlantic chairman and chief executive officer.

"The prospects of changing regulation and increasing customer requirements for high-value information and communications systems and services adds to the urgency of this move," Bolger said in an official statement to the company.

Potential new ventures that the future Enterprises Information Group will focus on include software, business support, hardware distribution and publishing, Bell Atlantic said.

The project will begin immediately, with overall implementation scheduled for Jan.1, 1988.

Say 'cheese!' Compaq buddies up to MS OS/2

BY ALAN ALPER
CW STAFF

NEW YORK — Compaq Computer Corp. last week went on the offensive to stress its support for Microsoft Corp.'s MS OS/2 operating system while reiterating disdain for the new technology on which IBM has chosen to run the successor to IBM's PC-DOS and Microsoft's MS-DOS.

At a carefully choreographed press conference here, Rod Canion, Compaq's president and chief executive officer, went to great lengths to dispel what he called a "nagging" misconception that MS OS/2 was just an operating system for IBM's Personal System/2 line. Canion also contended that MS OS/2 will run better on Compaq's machines than on PS/2s, although he did not provide statistics to substantiate his claim.

MS OS/2, he said, was developed to take advantage of the multitasking, larger address space and other advantages of microcomputers designed around Intel Corp.'s 80286 and 80386 microprocessor architectures.

Compaq will offer MS OS/2 on its family of 80286- and 80386-based microcomputers starting in early 1988, Canion said. The firm has not yet set a price for the operating system, which will be offered as an option, a company spokesman noted.

The Houston firm also said it has started shipping, free of charge, a support kit for developers working on applications for MS OS/2.

Demystifying IBM

Canion also sought to demystify IBM's OS/2 Extended Edition, which includes advanced data base management and data communications functionality. The open design of OS/2 is intended to allow third-party developers to provide extended capabilities for the operating system, including data base management and communications functions.

Canion said the extensions made available by third-party software vendors would likely be more memory-efficient than IBM's OS/2 Extended Edition, which reportedly will require 3M bytes of random-access memory.

"For some users — especially IBM's captive mainframe customers — the Extended Edition will serve a purpose similar to IBM's other specialized products, like the 3270 Personal Computer and [PC] AT 370," Canion said.

To bolster his contention, Canion was joined by Bill Gates, Microsoft's chairman, and the top executives of other leading software companies committed to developing packages that run under MS OS/2.

Analysts said they saw Compaq's announcement as an attempt to solve a perception problem.

Compaq, which continues to enjoy robust sales and earnings, wanted to clarify its position on MS OS/2 before fear, uncertainty and doubt cut into its market performance, noted Tom Roberts, an analyst with the market research firm International Data Corp. based in Framingham, Mass.

"I think Compaq called in some IOUs from the software industry," Roberts said, in reference to the software executives sharing the rostrum with Canion. "They wanted to show support for the old [hardware] architecture and for [MS] OS/2 as well."

Canion said he expects MS OS/2 and MS-DOS to coexist for the next several years by virtue of the latter's installed base on some 6 million Intel 8088- and 8086-based micros.

"[MS] OS/2 has the potential to become the industry's primary operating system as it gradually unleashes more of the power of the 286 and 386 architectures," Canion said. "But this will be a smooth, evolutionary process over many years."

PC Network speedup limited

Throughput gain only modest, but crowded networks get breathing room

BY ELISABETH HORWITT
CW STAFF

IBM's PC Network program Version 1.2 offers significant performance improvements over the older Version 1.12, but only in certain limited areas and for certain types of applications, according to a series of tests performed by an independent consulting company.

The tests — performed for *Computerworld* by Interconnect Network Consulting Group, Inc. in Pasadena, Calif. — found that the overall speed of workstation-to-server communications improved by as much as 840% when the newer PC Network program was used but that in most cases, network throughput would show only a 5% to 10% improvement. In some types of exchanges, such as read and write overlays of 512-byte records, throughput was actually slower with the new version of the program, the tests found.

Bruce Robertson, Interconnect's manager of products and services, and Judy Savage, manager of network engineering, conducted the tests at the headquarters of Sunnyvale, Calif., company Network General Corp., developer of the Sniffer protocol analyzer.

Popular benchmarks used

Robertson and Savage first compared the two network programs' overall performance through two widely used benchmark tools: the PC Magazine Bench Program and the Novell, Inc. Perform Utility. Next, using Sniffer, the consultants attempted to isolate the causes for the network performance differences by looking at packet activity on the network.

Tests showed that Version 1.2's buffer held 4K bytes, compared with Version 1.12's 512 bytes. The increased buffer space allowed a personal computer to collect multiple 512-byte records and send them in a batch, cutting down on the number of network transmissions.

This feature made a significant difference only during transfers of small records, however. During the PC Magazine test, Version 1.2 also demonstrated a 75% performance increase over Version 1.12 for sequential file writes and reads involving 512-byte records. But when 4,096-byte records were sent, the newer version upped overall throughput by only 5% for sequential file writes and 11% for sequential file reads. These results made the buffer's increased size less significant, Savage said, "because most records are 2K bytes or larger."

Version 1.2's larger buffer could be a drawback, since "waiting for the buffer to fill unnecessarily could even impede performance with small files," Savage said. For example, Version 1.2 performed worse than Version 1.12 in the Novell test for both read and write overlays involving 512-byte records. There is no need to load multiple records into a buffer during an overlay, since the same record is being repeatedly written to, or accessed on, the server's disk, Interconnect said.

IBM has also improved the program by cutting down on the number of packets needed to transfer a given amount of data over the network. Sniffer indicated that Version 1.2 used only 16 packets to write a 4,096-byte record to disk, while Version 1.12 used 24 packets.

Although cutting down on packets did not significantly improve throughput when network traffic was light, "it could make a big difference in throughput on a heavily loaded network by significantly reducing interrupts and data handling on the server," as well as saving on bandwidth utilization, said Network General President Harry Saal.

In previous tests by Network General, Sniffer found that Version 1.12 tended to waste time and bandwidth with unnecessary exchanges between the personal computer and the server, asking repeatedly for the same group of bytes when they had already been sent [CW, April 13].

'Still a long way to go'

The new PC Network program has "cleared away some of that repetitive asking, but it still has a long way to go," Saal said.

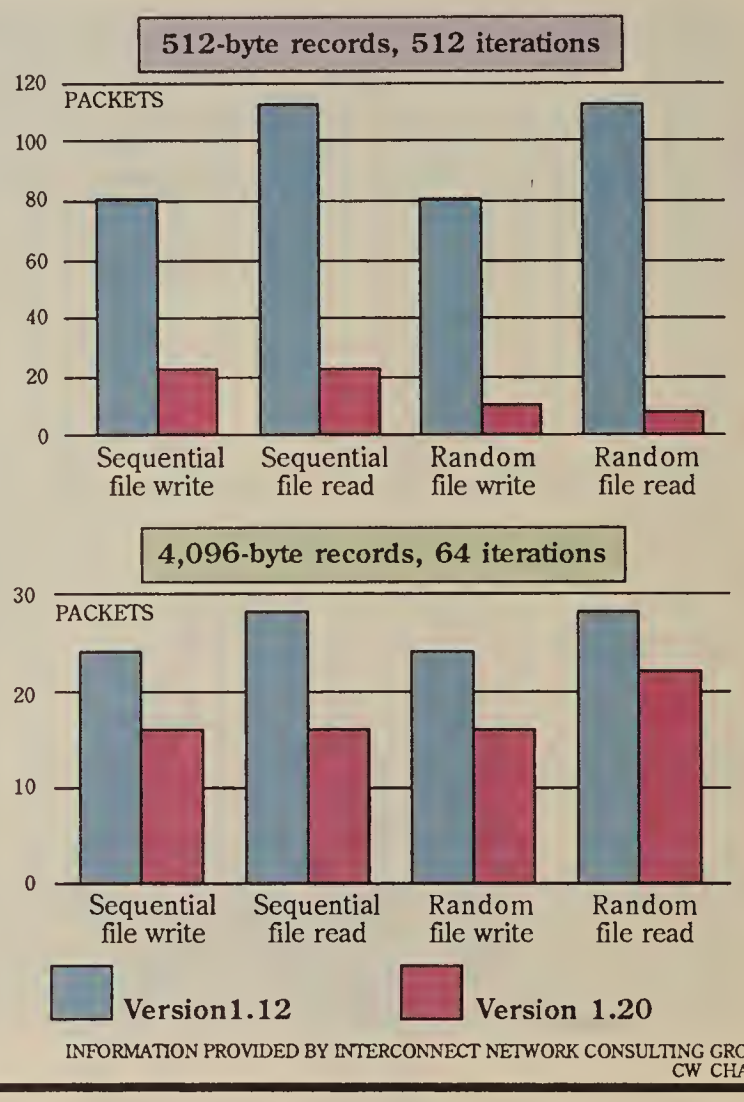
During the tests of Version 1.12 by the Interconnect consultants, Sniffer sensed at one point during a 512-byte random file read that no network activity was taking place. "We realized the problem was that the program was reading the same file into [random-access memory] over and over," Savage said. With Version 1.2, which showed a 54% improvement over Version 1.12 in the same test, IBM has eliminated some — but by no means all — of these unnecessary loops and exchanges, the consultants concluded.

"IBM has increased performance in the PC Network program significantly in certain specific areas and uses more state-of-the-art techniques in handling packets. However, in an actual user environment, the overall throughput improvement will only be moderate," said Mark Freund, Interconnect vice-president of design and engineering, who took part in the analysis.

The tests measured throughput for an IBM Personal Computer doing various types of disk access on a Compaq Computer Corp. Portable III file server across a PC Network. They measured the performance of PC Network Version 1.12 running with IBM's PC-DOS 3.1 operating system against the performance of PC Network Version 1.2 running with PC-DOS 3.3.

PC Network benchmark

Version 1.20 of IBM's PC Network demonstrates greatest efficiency improvement with small records in Sniffer bench tests



INFORMATION PROVIDED BY INTERCONNECT NETWORK CONSULTING GROUP
CW CHART

Lotus ups DB2 support, betters TAC

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. last week added support for IBM's DB2 and improved the user interface of The Application Connection (TAC), Lotus's personal computer-mainframe data extraction and translation package.

By easily providing mainframe data to Lotus 1-2-3 users, TAC provides a key element of Lotus's MIS strategy. The company has developed a number of products that enhance 1-2-3 in its function as a standard interface to corporate data. They include a report generator, a natural language interface, some services that provide prepackaged data and a planned mainframe version of 1-2-3.

While TAC offers a relatively simple way for PC users to extract data from host systems, the lack of a DB2 connection and other shortcomings have kept many users away. Even at TAC's introduction last year, the need for a DB2 connection was clear.

"People have been testing DB2 for a while and are ready to go into production. But there are not a lot of useful tools. Users don't know SQL," said Maurice Shore, TAC product manager at Lotus.

Avoids mainframe syntax

In addition to releasing the DB2 connection demanded by MIS customers, Lotus has upgraded TAC's end-user interface, completely shielding 1-2-3 users from the complexity of mainframe syntax.

With the new release, 1-2-3 users can access mainframe data using the syntax native to 1-2-3 and without leaving the spreadsheet environment.

According to Shore, users have the ability to play "what-if" games with the mainframe from within a 1-2-3 spreadsheet.

Lotus has also made host-oriented enhancements to TAC, including limiting the number of records that can be pulled out of a mainframe data base, Shore said. Other enhancements include giving MIS the ability to adjust the ways in which null values are represented in a data base and the ability to control the resources allocated to a particular end-user request.

More tools promised

Future revisions will include the support of more host applications and will provide more tools for DP and MIS, such as automatic logging and report generation for chargebacks, Shore said. Also on the way is a connection to VSAM files, but Shore provided no time frame for delivery.

A feature that Lotus has done little to publicize is TAC's ability to extract mainframe data from minicomputers and high-end workstations. TAC extracts data by creating a request file, which can be created and sent by a variety of systems. "It doesn't matter where the request file came from. It isn't machine-specific," Shore said.

> "PEOPLE have been testing DB2 for a while and are ready to go into production. But there are not a lot of useful tools. Users don't know SQL."
>
> MAURICE SHORE
> LOTUS DEVELOPMENT CORP.

More competition is on the way for Lotus. Ashton-Tate is said to be planning to bring to market a product that extracts data from IBM System/36 applications and to extend this product to include connections to IBM mainframe applications. "We don't have our eyes on the System/36 market," Shore said, adding that, with Ashton-Tate's planned market entry, "It is going to be competitive."

One user is not running out to buy TAC. Steve Owens, national microcomputer coordinator for Price Waterhouse in Chicago, said the mainframe components of TAC are considered too "pricey." Most end users who need to download from a mainframe already have a facility for doing so, he said.

MVS versions of TAC are currently available, and a VM version will ship in the fourth quarter. The MVS/TAC Connection costs $13,000, the VM/TAC Connection costs $10,000 and optional modules for individual mainframe applications range from $8,000 to $15,000.

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CA	Lafayette	Jul 30, Sep 24
	Los Angeles	Jul 16, Aug 13, Sep 8, Sep 30
	Newport Beach	Jul 21, Sep 17
	Sacramento	Aug 13
	San Diego	Jul 30, Sep 10
	San Francisco	Jul 21, Aug 18, Sep 15
	San Jose	Jul 9, Aug 6, Sep 2
CO	Colorado Springs	Jul 16, Sep 17
	Denver	Jul 14, Aug 13, Sep 15
CT	Hartford (Farmington)	Jul 23
	New Haven	Jul 28
DE	Wilmington	Jul 9, Sep 1
FL	Ft. Lauderdale	Jul 16
	Jacksonville	Sep 9
	Orlando	Jul 15
	Tampa	Sep 10
GA	Atlanta	Jul 8, Sep 16
	Macon	Aug 13
HI	Honolulu	Sep 17
IA	Des Moines	Jul 15, Sep 17
IL	Chicago	Jul 14, Aug 19, Sep 15
	Springfield	Aug 11
IN	Indianapolis	Jul 21, Aug 12, Sep 24
KS	Wichita	Aug 4
KY	Louisville	Sep 10
LA	Baton Rouge	Jul 23
	New Orleans	Aug 21
MA	Boston	Jul 16, Aug 25, Sep 10
	Burlington	Sep 30
	Springfield	Sep 16
	Worcester	Aug 5
MD	Baltimore	Jul 28, Sep 3
	Bethesda	Jul 28, Aug 6, Sep 8
MI	Detroit	Jul 14, Aug 11, Sep 15
	Grand Rapids	Jul 8
	Traverse City	Jul 28
MN	Minneapolis	Jul 28, Aug 26, Sep 29
MO	Kansas City	Jul 23, Sep 22
	St. Louis	Jul 16, Aug 18, Sep 16
NC	Charlotte	Jul 22, Sep 23
	Raleigh	Jul 15, Sep 16
	Winston-Salem	Aug 12
NE	Omaha	Jul 9
NH	Manchester	Aug 27
	Nashua	Aug 13
NJ	Cherry Hill	Jul 30, Sep 9
	Iselin	Jul 15, Jul 23, Aug 5, Aug 18, Sep 16, Sep 29
	Princeton	Jul 9, Aug 12, Sep 22
NM	Albuquerque	Jul 7, Sep 22
NV	Las Vegas	Jul 9, Sep 9
NY	Albany	Jul 14
	Buffalo	Aug 6, Sep 29
	Long Island	Sep 15
	New York City	Jul 8, Jul 16, Jul 22, Jul 29, Aug 6, Aug 13 Aug 19, Sep 9, Sep 17, Sep 23
	Rochester	Jul 30, Aug 20, Sep 22
	Syracuse	Jul 7
OH	Cincinnati	Aug 5
	Cleveland	Jul 16, Aug 13, Sep 17
	Columbus	Aug 4, Sep 30
	Dayton	Jul 21, Aug 18, Sep 22
OK	Oklahoma City	Jul 21, Sep 15
	Tulsa	Aug 11
OR	Portland	Jul 21
PA	Harrisburg	Aug 4, Sep 15
	King of Prussia	Jul 16, Sep 17
	Philadelphia	Jul 9, Aug 6, Sep 10
	Pittsburgh	Sep 8
RI	Province	Jul 8
SC	Charleston	Aug 12
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TX	Austin	Aug 12
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	Houston	Jul 9, Aug 6, Sep 18
	Lubbock	Aug 4
	San Antonio	Aug 13
UT	Salt Lake City	Jul 28, Sep 29
VA	Norfolk	Jul 14
	Richmond	Jul 8, Sep 8
	Virginia Beach	Jul 23
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WA	Seattle	Aug 6, Sep 3
WI	Green Bay	Aug 10
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† *Digital News*, December 1, 1986.

‡ Gartner Group currently available research

TRBA

NAS to plug mid-range gap with four CPUs

BY JEFFRY BEELER
CW STAFF

MOUNTAIN VIEW, Calif. — National Advanced Systems Corp. (NAS) tomorrow is expected to introduce four IBM-compatible machines to fill the price/performance gap between its high-end IBM 4381-class and low-end IBM 3090-compatible processors.

As previously reported, the four AS/VL series processors are expected to range in performance from 5 million to 17 million instructions per second and are intended to provide an upgrade path for existing 4381-class users who need to migrate to the 3090 line or its plug-compatible equivalent [CW, May 18].

The additions to NAS's hardware offerings are fundamentally identical to a CPU family that the vendor announced in March in Europe and that its Japanese equipment supplier, Hitachi Ltd., introduced later that month in Japan.

For customers whose 4381s are fast running out of gas, the AS/VL series' imminent debut should come as welcome news. "If customers can gain additional horsepower and, at the same time, postpone the change to a new operating system, they can save themselves a lot of grief," said Randy Sessler, senior systems engineer at Memorex Corp.'s Communications Group, a 4381 user.

IBM also fills hole

With the announcement of the AS/VL family, NAS appears to be seeking to counter a comparable move by IBM to fill a price/performance hole of its own. In a sharp departure from tradition, IBM recently closed a glaring gap in its processor line by extending the 4381 upward and simultaneously lowering the 3090's entry point with the introduction of the Model 120.

The closure marks "the first time in more than 20 years" that IBM has offered a smooth upgrade path between its intermediate and high-end systems, according to Rick Martin, research analyst with Sanford C. Bernstein & Co.

Both IBM's and NAS's efforts to link their 4381- and 3090-class CPUs come at a time when demand for systems in the AS/VL's price/performance category is rapidly growing.

The machines typically serve either as dispersed processors in the regional offices of giant corporations or as central hosts in medium-size businesses, according to Van Weathers, a Dataquest, Inc. industry analyst.

By providing a transition between the 4381 and the 3090, AS/VL-class processors "are creating a big new market for themselves rather than siphoning sales away from the high end," Weathers said.

Although NAS last week acknowledged tomorrow's announcement, it declined to release any details about the products, including their prices. But the machines are expected to maintain NAS's traditional 20% edge in price/performance over IBM's equivalent models.

As with previous NAS product announcements, the AS/VL series processors are appearing on the U.S. scene several months after their introduction overseas. The delay in domestic availability probably resulted from the need to modify the Hitachi machines slightly for the American market.

"Japanese customers aren't as demanding of total IBM compatibility as their U.S. counterparts," said Ulrich Weil, head of investment research firm Weil & Associates. "So before a machine that Hitachi made in Japan can be sold to American users, it usually needs some engineering changes."

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Symbolics stressing MS-DOS links

Unix, Microsoft processor connectivity emphasized in 386 board

BY STANLEY GIBSON
CW STAFF

SEATTLE — Symbolics, Inc. will announce today software that would allow applications developed on a Symbolics workstation to run on Unix and Microsoft Corp. MS-DOS-based processors, according to a source close to the company.

In addition, the maker of LISP-based workstations will announce a board containing the Intel Corp. 80386 microprocessor, which will enable its workstations to run Unix and MS-DOS programs, the source indicated.

The announcements are two of several that the Cambridge, Mass.-based company is expected to make at the American Association for Artificial Intelligence show here. Symbolics will also reportedly announce IBM 3270 terminal emulation for its workstations, allowing them to connect to an IBM mainframe in a Systems Network Architecture network.

Team chip?

Symbolics will also reportedly announce that it will collaborate with Intel in microprocessor design. Symbolics has been searching for a chip maker to produce its design for a microprocessor containing all of Common LISP, but it is uncertain whether Symbolics will announce at this time that Intel has been chosen to make the chip.

Last week, Intel and Texas Instruments, Inc., a rival of Symbolics in the LISP-based artificial intelligence market, agreed to share technology for application-specific integrated circuits (ASIC). An Intel spokesman said ASIC activities and AI efforts are kept separate.

Symbolics is also expected to announce a C programming environment and support for the X Windows proposed windowing standard interface for Unix.

Several industry observers confirmed that the announcements will be made and said the moves show a change in strategic direction by Symbolics.

Welcome strategy

"This is the best strategy that Symbolics can have at this point," said Kenneth Sonenclar, an analyst with New Science Associates, Inc. in South Norwalk, Conn. "Symbolics has been severely lacking in simple office function," he said, explaining that by adding commonly used desktop functions to a Symbolics workstation, Symbolics could clear away one reason not to buy its workstation — that it does not do normal desktop tasks.

Most important, he said, is the software facility, which will enable a user to write applications on a Symbolics workstation that will be readable by an 80386 processor.

Another industry watcher was less enthusiastic about the new direction for Symbolics. "They are trying to get LISP into the hands of the masses, rather than telling the world they have the absolute best AI workstation," said Harvey Newquist, editor of "AI Trends," a newsletter based in Scottsdale, Ariz.

Newquist sharply criticized the strategy, saying it is a potentially disastrous departure from Symbolics' traditional strengths.

"They must go back to what they know best. The government, military and research and development groups are their market," Newquist said.

The high-end market, although small, will always be there, he said. But instead of concentrating on that field, Symbolics is going after the same market as Sun Microsystems, Inc. and Apollo Computer, Inc. "They've ceased to concentrate on being the most technologically adept," he said.

The 80386 board will reportedly cost approximately $6,000, and the software license for a single processor to develop programs to run on MS-DOS and Unix systems will be priced in the neighborhood of $7,000.

Jeff Canin, an analyst with Hambrecht & Quist, Inc., a San Francisco investment banking firm, said the Intel agreement, along with a recent $500,000 contract with the National Aeronautics and Space Administration and healthier bookings in the quarter just ended, paint a brighter picture for Symbolics.

In January, Symbolics laid off 160 workers; in October 1986, the firm took a $13.2 million write-off due to an abortive corporate move from Cambridge to Concord, Mass.

Northern Telecom switches architecture

BY ELISABETH HORWITT
CW STAFF

NEW YORK — Attempting to out-position AT&T as chief equipment supplier for the divested Bell operating companies' anticipated invasion of the enhanced-service market, Northern Telecom, Inc. last week introduced a central-office switch architecture to support these future offerings.

The DMS-Supernode is a modular, digital central-office system that "will accelerate delivery of enhanced information services and permanently change the way that telephone networks are designed and built," said Roy Merrills, group vice-president for Northern Telecom's Integrated Network Systems Division.

The Supernode's modular architecture reportedly allows operating companies to add or delete processing nodes, switches, line cards and peripherals to support whatever features and services are in demand at a given central office. This should allow carriers to cost-justify enhanced services, according to Bart Stuck, a vice-president at Probe Research, Inc., a New York consulting firm.

Operating companies and their business customers can also implement applications and services on other computers and link them to the Supernode via standard telecommunications interfaces, such as Integrated Services Digital Network Primary and Basic Rate Interfaces and the Signaling System 7, said Alan Lutz, vice-president of group operations for Northern Telecom's Integrated Network Systems Division. "I could see a bank that wanted automatic access to data bases in three remote sites writing an interface to Supernode," Lutz said.

Stuck estimated that the Supernode could decrease the cost of installing a new service by as much as a factor of 10. "This will give AT&T a lot to think about," he said. AT&T is the largest central-office switch vendor in the U.S. market; Northern Telecom ranks second. While AT&T currently does not have a central-office system comparable to Supernode, it is "likely to come up with one," Stuck said.

The Supernode's architecture centers around Northern Telecom's 128M bit/sec. DMS-Bus, which supports multiple computing nodes, called DMS Cores, that can be implemented in modular fashion whenever a carrier wants to add services or switch capacity. For example, one DMS Core could control a CCITT X.25 packet switch, a second could control a DMS 100 digital switch, a third could control an 800-number service and a fourth could control a software-defined network.

A machine-independent software compiler will permit the Supernode to support other hardware processors in the future, including some based on reduced instruction set computing technology, the company said.

Northern Telecom will also, for the first time, release documentation for its development environments so that Bell operating companies can develop their own applications, Lutz said.

Northern Telecom reportedly has tentative orders for some 200 switches from various Bell operating companies. Not all of the holding companies are ready to sign on the dotted line, however.

After some initial conversations with Northern Telecom, Bell Atlantic Corp. is "cautiously interested" in the switch, according to company spokesman Larry Plumb. "It looks like an improvement, but we need more details," he said.

IBM enhances Convertible line with backlit LCD

RYE BROOK, N.Y. — IBM's Entry Systems Division announced last week an addition to its Convertible computer line that features a backlit LCD and an enhanced power supply.

The IBM Personal Computer Convertible Model 3 uses 3½-in. disk drives and is compatible with IBM's Personal System/2 family, according to an IBM announcement. The announcement also said the intensity of the display's internal illumination adjusts so information can be viewed with or without external lighting. The unit is available now for $1,695.

The use of low-power CMOS technology allows the Convertible Model 3 to operate, with average use, for up to four hours on the new backlit display or up to 10 hours on the reflective display used on the PC Convertible Model 2, IBM said. Both the backlit and reflective displays use supertwist technology.

The static CMOS memory is expandable to 640K bytes, IBM said. An optional internal modem supports both IBM's and Hayes Microcomputer Products, Inc.'s Attention command sets. The backlit display and enhanced power supply can be purchased as an upgrade to other models of the Convertible computer for $350.

IBM also announced last week a price reduction on the PC Convertible Model 2 to $1,395 from $1,695.

Focus sharpened for DB2 development

BY ROSEMARY HAMILTON
CW STAFF

NEW ORLEANS — Information Builders, Inc. today is slated to introduce an application development system for IBM's DB2 that is based on Focus, the company's fourth-generation language and data base management system.

Information Builders "is acknowledging that DB2 is the de facto standard," said Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y. "They are trying to say, 'We existed with IBM's IMS, and now we can with DB2.' "

Focus for DB2 does not include the data base portion of the Focus package, which marks the first time the vendor has offered such a tool for the IBM mainframe environment.

Applications for DB2 using 4GL

Focus is intended to allow users to develop applications for DB2 using Information Builders' fourth-generation language and programming facilities.

Today's rollout is set to take place at the Information Center Conference and Exposition being held here this week.

"There are a lot of users who don't use Focus and don't want a Focus data base on their system. They want a DB2 data base," said Vern Sheidler, marketing services manager at Information Builders.

The DB2 front end carries a license fee of $67,000. The vendor has been offering a DB2 interface for its current Focus package for $16,000. It was designed to work with the Focus system, which costs $66,000.

With the current products, a user can neither add nor delete records against DB2 without the Focus data base component, Sheidler said. Focus for DB2 will allow that capability, he added.

According to Sheidler, the new system will provide DB2 users with an easier environment in which to develop applications than is currently offered by IBM.

Not much faith in IBM

"IBM has never been known for developing good application development facilities, and that applies to DB2," Scheidler said.

Information Builders is said to be targeting the product at the growing DB2 marketplace, which Atre estimated will have an installed base of 2,000 by year's end.

"Users are still trying to get a handle on DB2," Sheidler said. "They've wanted DB2, but they don't like using SQL and Cobol to develop applications."

Novell unveils E-mail gate

BY PATRICIA KEEFE
CW STAFF

PROVO, Utah — Novell, Inc. took another step toward integrating its networks into corporatewide systems with its announcement last week of a gateway that transfers messages between Novell networks and a variety of electronic mail systems from IBM, Digital Equipment Corp. and other minicomputer vendors.

Scheduled to be available in September, the gateway reportedly will cost $3,000 and support multiple Novell networks and servers.

"Electronic mail is one of the most important links in a company, and this gateway [connects to] the most widely used messaging systems in corporate environments," said Craig Burton, Novell's vice-president of corporate marketing and development.

The link between Novell Netware-based networks and dissimilar mail systems will be provided by The Mailbridge Server/The Coordinator gateway, communications software installed in a dedicated personal computer acting as a network server.

Three vendors' products included

The gateway was jointly developed by Novell, Action Technologies, Inc. in Emeryville, Calif., and Soft-Switch, Inc. in Wayne, Pa. The message-transfer process actually incorporates products from all three companies.

Messages are created using Action Technologies' The Coordinator software, an E-mail, word processing and scheduling system that runs on Novell networks.

Messages are routed to The Mailbridge Server gateway on the network using Novell's Message Handling Service, a store-and-forward data transfer service announced in February.

The Mailbridge Server converts the message from The Coordinator format to an IBM Professional Office System (Profs) format, for example, and delivers it to the addressee on the Profs system, Novell claimed.

Messages can only be transferred to E-mail systems that also have a Mailbridge gateway. Soft-Switch's family of Mailbridge products provide document interchange and transparent interconnection of multivendor E-mail systems.

DEC cuts Vaxmate prices in UK; no change here

BY JAMES CONNOLLY
CW STAFF

LONDON — Digital Equipment Corp. slashed the prices of Vaxmate personal computers sold in the UK by up to 24%, but DEC officials said last week that the move will not affect the U.S. market.

Observers in the UK speculated that DEC was repositioning the Vaxmate, an IBM Personal Computer AT-compatible system, in the wake of May announcements that lowered the entry point for its Vaxstation 2000 to $6,156 in the UK and $4,600 in the U.S.

The Vaxmate price cuts became effective July 1 and brought the price of a Vaxmate purchased in the UK down to $3,750. Previously, the PC had sold for $904 more in the UK than in the U.S. The current price in the U.S. is $4,045 for a Vaxmate with 1M byte of memory and a 1.2M-byte floppy disk drive. An optional expansion box housing a 20M-byte disk drive is available for $1,945.

UK observers claimed that DEC has had trouble distinguishing the Vaxstation from the less expensive Vaxmate. However, a DEC official in the U.S. said the difference is clear between the Vaxstation and Vaxmate markets.

"The Vaxstation 2000 is really an engineering workstation, and it hasn't impacted the Vaxmate as yet," said George Symula, office programs manager for DEC. Symula said the fact that Vaxmates carried a higher price in the UK than in the U.S. may have been a factor in the price cuts but emphasized that DEC marketing groups in each country make their own pricing decisions.

He declined to comment when asked whether similar price cuts are planned for Vaxmates in the U.S.

MS-DOS tied to Unix data

BY PATRICIA KEEFE
CW STAFF

SANTA MONICA, Calif. — Locus Computing Corp. and Network Innovations Corp. in Cupertino, Calif., have announced a joint, nonexclusive marketing and development agreement designed to allow users of applications based on Microsoft Corp.'s MS-DOS to access and retrieve data stored in Unix data bases.

Under the pact, the two firms will integrate Locus's PC-Interface and Merge 386 MS-DOS and Unix integration technology with Network Innovations' Multiplex data access software.

PC-Interface and Merge 386 provide transparent MS-DOS and Unix integration at the command and file-system levels. Multiplex allows users to query data on Unix data bases from MS-DOS applications.

Merge 386 will also be integrated with Multiplex. "The Merge 386 and Multiplex integration provides the same functionality for Unix systems based on Intel [Corp.'s] 80386 microprocessor and represents the first applications-level MS-DOS and Unix integration software running in the Merge 386 environment," said Michael Smith, director of marketing and sales at Locus.

The two vendors will jointly demonstrate but separately sell their products.

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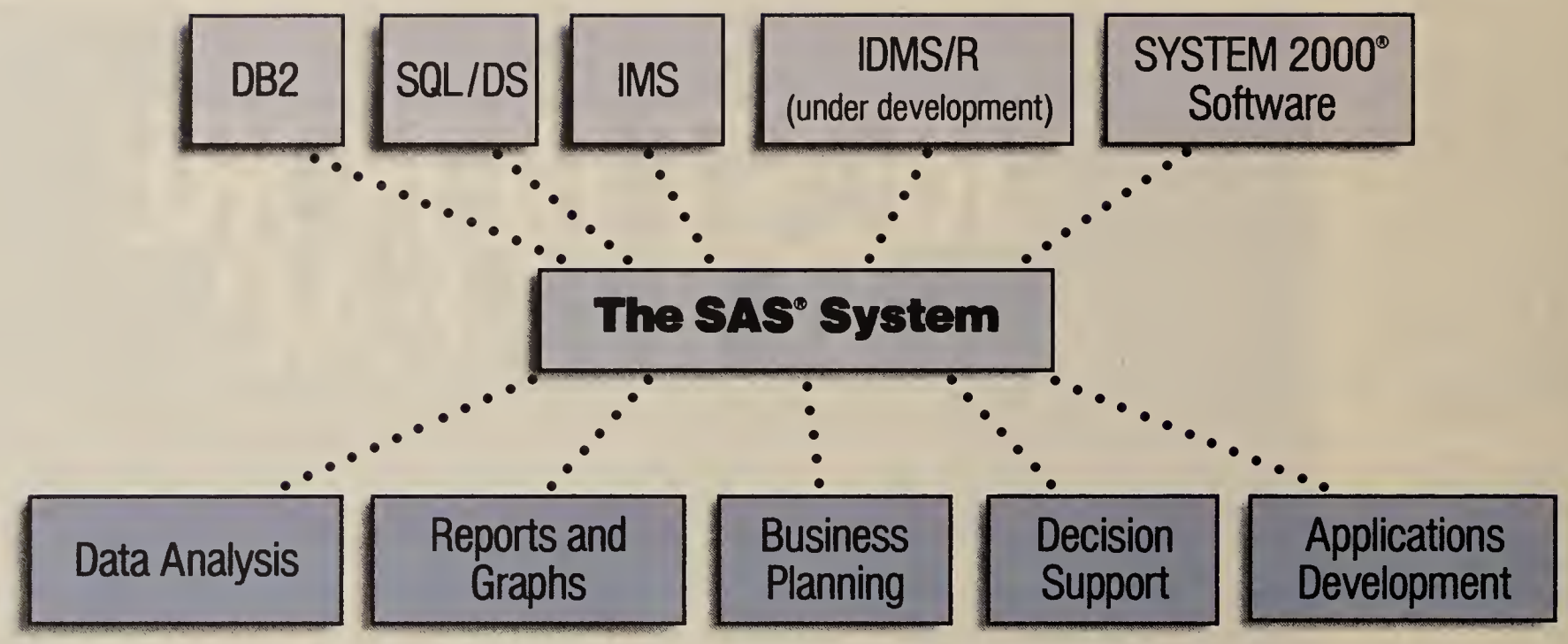

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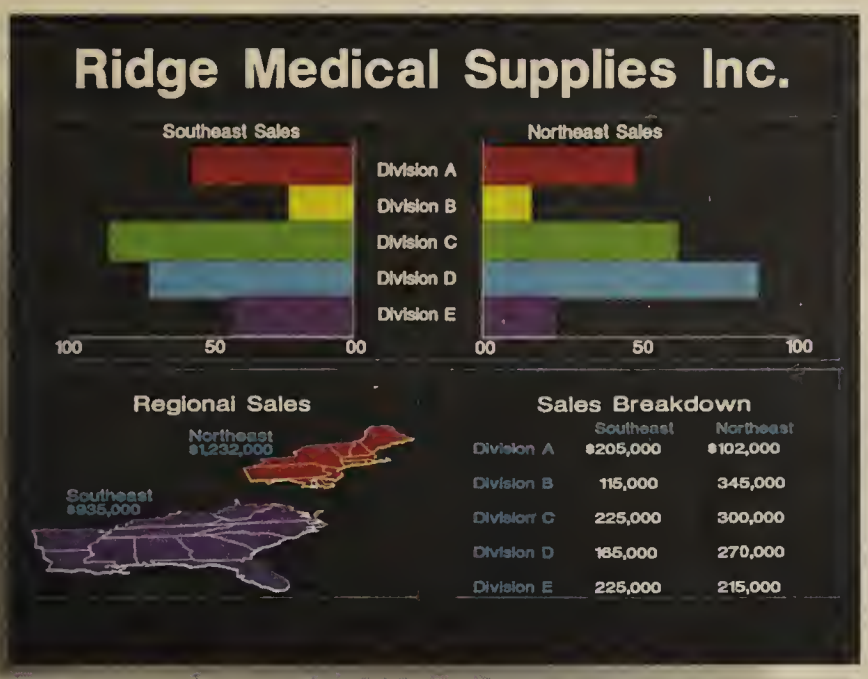

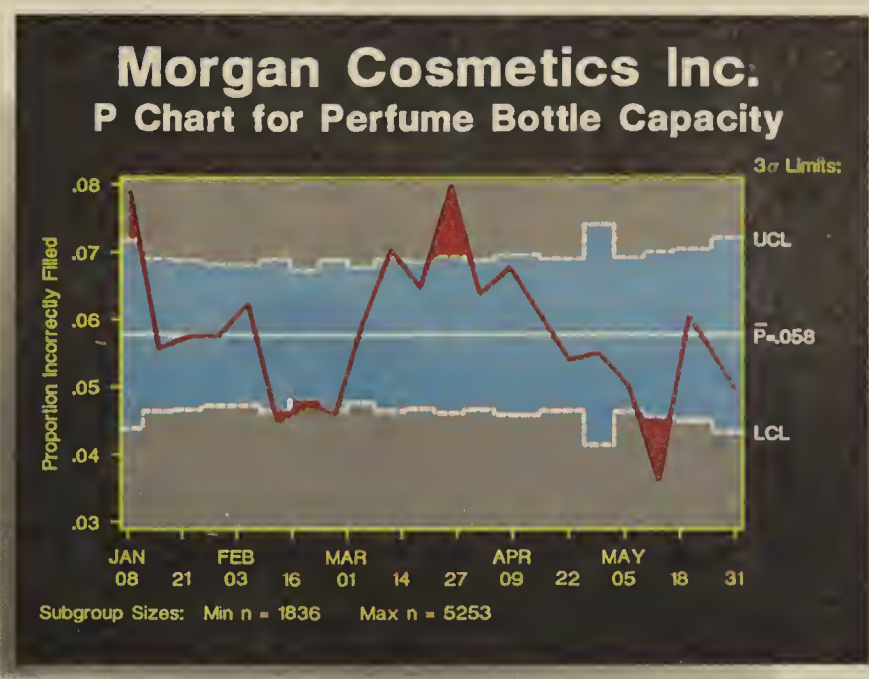

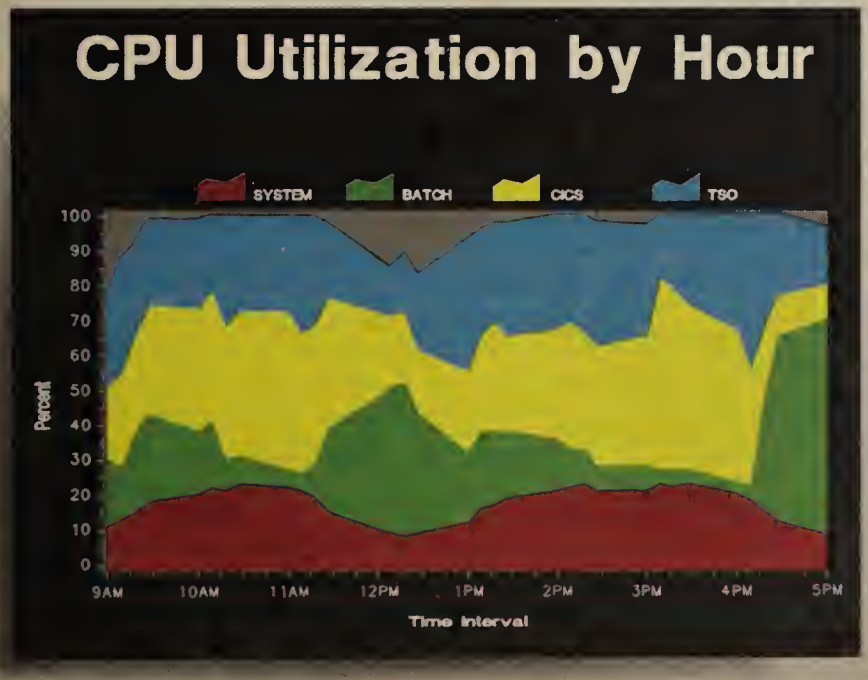

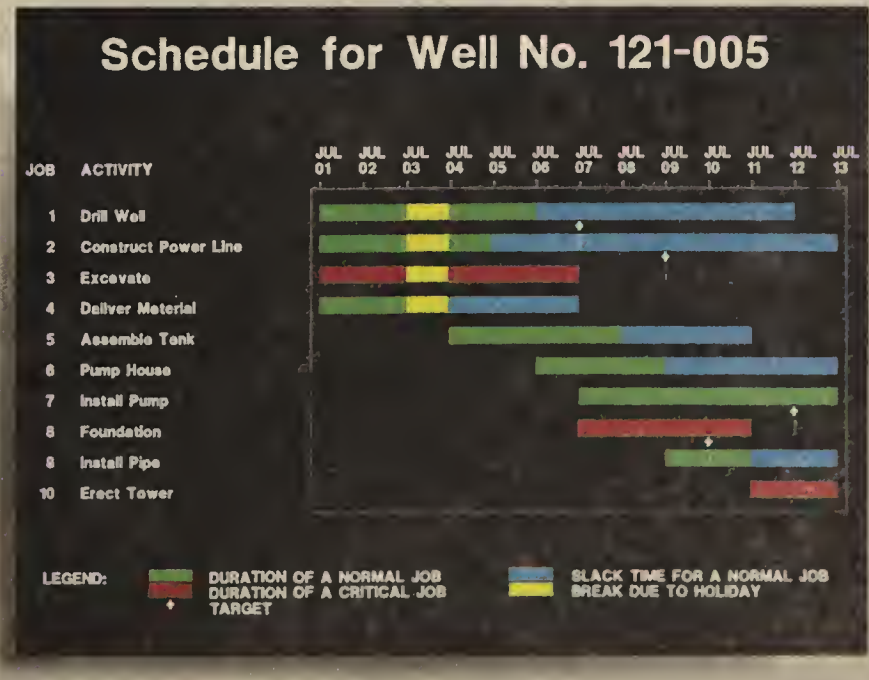

The SAS System runs on IBM Corp.'s 370/30xx/43xx and compatible machines, as well as minicomputers and personal computers.

Turbolaser revamp incorporates Postscript

BY JAMES A. MARTIN
CW STAFF

IRVINE, Calif. — AST Research, Inc., last week announced that it will begin shipping in September a new version of its desktop laser printer, Turbolaser/PS, which includes Adobe Systems, Inc.'s Postscript page-description language that has become a microcomputer publishing standard.

AST said it will create a new price/performance standard in the increasingly competitive desktop publishing market. The firm claimed the Turbolaser/PS, retailing for $3,995 and offering 35 fonts, is the lowest priced Postscript printer on the market.

The Turbolaser/PS will be marketed as a stand-alone alternative to desktop publishing printers in a variety of processor environments, including Apple Computer, Inc.'s Macintosh, IBM's Personal Computer and Personal System/2 series and Digital Equipment Corp. products, among others.

In addition, the printer will be bundled with AST's desktop publishing package, Premium Publisher, the foundation of which is AST's Premium/286 microcomputer.

"We've broken a major price-point barrier by being under $4,000 with 35 fonts," claimed Charles R. Cortright Jr., director of marketing for AST's systems group.

Turbolaser/PS is an 8 page/min, 300 dot/in. resolution laser printer with Adobe's typeface libraries resident in a read-only memory (ROM) chip on the AST Postscript controller board. The 12.5-MHz controller board incorporates a Motorola, Inc. 68000 microprocessor, 3M bytes of random-access memory and 1M byte of ROM.

The controller board is available as a stand-alone product to upgrade existing Turbolaser printers for $1,995.

DEC strafing Air Force bid requirements

BY ADAM STONE
CW STAFF

Digital Equipment Corp. registered a formal protest with the U.S. Air Force recently, charging that the Air Force cannot legally require a vendor to supply AT&T's Unix System V.

At issue is an Air Force request for proposals (RFP) on a contract reportedly worth $3.5 billion. The RFP, issued in February, requires bidders' systems to conform to the Unix System V Interface Definition. DEC supports Ultrix, a version of Unix based on the University of California at Berkeley's Unix 4.2. System V and Ultrix are generally thought to be incompatible.

"The fact is that the RFP calls for an operating system proprietary to AT&T," DEC spokesman Frank Donovan said. Since AT&T is one of the bidders, DEC argued, the RFP disallows fair and open bidding and violates the 1984 Competition in Contracting Act, which specifies that government proposals must be written in functional terms, without trade names.

'Repeated requests'

"Since February, DEC has made repeated requests of the Air Force to modify the request," Donovan said. "The Air Force could have written the RFP in such a way that the operating system was discussed in terms of functionality."

According to Clarice Marie Burch, Unix System V product manager at AT&T, the Unix System V Interface Definition is the only published Unix operating system standard. In specifying this Unix definition, she argued, the Air Force used "the only standard they could use which would include multiple vendors with the same operating systems on their individual hardware."

According to Air Force spokesman Lt. Frank Kozlowski, the RFP is not restrictive to the AT&T system. The RFP, he said, calls for "20,000 standard multiuser small computer systems" and specifies that these systems must have "functional conformance" with the Unix definition.

According to Kozlowski, the Air Force defines functional conformity here as "the degree to which the operating system performs the functions identified in the [Unix definition] as measured by the System V verification suite."

And that, DEC claimed, is unfair. "When you say it has to meet that test specification, you eliminate a lot of people," Donovan contended. Burch argued that "the capacity for Berkeley [Unix 4.2]-based systems to be a contender for this bid is fair. The majority of the functionality is present in both Unix and Ultrix as defined by the [Unix definition]."

Computerworld has reported that DEC had offered Unix System V support to AT&T and regional Bell holding companies [CW, June 22], but Donovan said that does not affect DEC's protest. "We do offer System V to customers who request that. But when the government offers an RFP, we feel that the competition should be open."

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EDITORIAL

Blueprint for MIS

The formula for success in MIS management usually includes technical competence, business experience, human relations skills and management expertise. Rarely does it encompass a facility with a blueprint and T square.

But the process of physically designing a data center, as this week's Executive Report (page 53) points out, is one of the most important and challenging tasks an MIS department will confront. In a time when firms are increasingly viewing information strategically, it could also present a golden opportunity for MIS.

Designing a data center gives a company the chance to thoroughly examine the value it places on MIS. Those firms that hope to capitalize on innovative uses of information won't cut corners on such discretionary items as extra floor space and backup power supplies. However, constructing a data center is expensive, and the burden is on MIS to prove those costs are justified.

Experts point out that a data center should be built with the next five to 10 years in mind — a tall order when you consider that two generations of technology will pass in that time. Nevertheless, the structure must take into account what kinds of networks will be installed, how much processing power will be needed and where that power will be located. It must provide for more users, smaller machines, changing communications requirements and unforeseen economic trends that will affect computer use. And it must do it in an industry that is the most dynamic and unpredictable in the world.

It is incumbent for MIS to not only answer these questions, but to ask them in the first place. It is not enough to respond to future needs as perceived by top management. Rather, MIS must identify areas of growth that management may overlook. For example, has the company considered how it will automate its sales force? Will computer-integrated manufacturing be employed? Can on-line systems be used to link supplier and customer? Will all those personal computers on managers' desks communicate with each other, and, if so, will it be through a local-area network, minicomputer or mainframe?

These are difficult issues for MIS to tackle. They require a thorough grounding in available technology and a solid concept of where that technology is going. More important, they drive home the need for MIS to understand its business almost as thoroughly as senior management does. Yet the payoffs of a well-planned data center initiative for MIS are substantial. The process of determining user requirements can open clogged communication channels and enhance the image of MIS as a user-driven operation. The job of hammering out approval for a construction plan affords both management and MIS the opportunity to examine the value of information processing to the organization. But done right, a data center project can give MIS its day in the sun. It is a chance to map out a blueprint of an organization's information needs, with MIS positioned squarely at the center.

LETTERS TO THE EDITOR

Standards needed

The frustration Charles Cresson Wood showed in his letter, "Security prudent" [CW, June 8], is understandable. However, management is not the total villain. One reason some organizations do not adopt security measures is that there are no accepted standards of due care for the protection of computerized data that current courts enforce.

Most nonlawyers are surprised to discover that, as a rule, one is not responsible in tort for the intentional misconduct of another that one might have taken steps to prevent, except in very restricted situations, and protecting data bases against hackers and the like who can cause financial damage to individuals does not qualify, at least not now.

Although computer security controls have been well known to practitioners for some time, they are not standardized, just as Cobol was once not standardized. Until standardization comes, there is little hope of recovery in tort for failure to protect computerized data, thus little incentive for some management to act as security practitioners would prefer.

Michael H. Argranoff
Stafford Springs, Conn.

Sprint rebound

The column "Too little, too late?" [CW, June 1] is an example of a notion that U.S. Sprint Communications Co. would like to dispel: that our efforts to penetrate the major customer market have fallen short.

Quite the contrary. In the 11-plus months of its existence, Sprint has not only increased its Fortune 500 coverage — we serve 476 of these at last count — but is also seeing a greater shift from lower usage to higher levels of large users than the column would suggest.

In fact, such companies as American Express Co., Automatic Data Processing, Inc., Formica Corp. and Sears, Roebuck and Co. depend on Sprint for all or a major share of their long-distance voice, video and data requirements. We think that speaks for itself.

As for new products, we recently announced our new 800 service, which will be the industry's only all-fiber 800 offering when our nationwide, all-digital, fiber-optic network is completed; and Telenet Communications Corp., despite the column's inference, also recently introduced its initial T1 integrated data and voice service.

Sprint has been moving aggressively since our joint venture with Telenet in July 1986, and I believe the best measure of our success is not the growth of our market share or our customer base but the recognition and reaction from our competitors to our presence in their once-exclusive territory.

Christopher E. Clouser
Senior Vice-President
Corporate Relations and Administration
U.S. Sprint Communications Co.
Kansas City, Mo.

This week in history

July 11, 1977
A Senate bill that would create an independent government-financed standards board and a new Institute of Standards and Accreditation in the National Bureau of Standards is receiving strong support from the computer industry.

July 12, 1982
The microcomputer boom and growth of consumerism within the software industry is shifting the focus of new software development from the high end to the low end, analysts say. While the industry is still spending money on mainframe software, it is primarily for enhancements, with most new development focusing on products for the desk top.

Respond to crisis

I want to respond to some of the questions addressed in "Top students shunning MIS" [CW, June 15].

Although some business leaders and academicians are not sure there is a need for MIS professionals or in what direction MIS is heading, I am convinced companies cannot maintain or advance their posture in their industries without good hands-on MIS people directing their information resources because of the increasing interdependence of world economies due to global competition.

These companies must realize that they need to recruit and hire MIS people. As Ted Stohr, chairman of New York University's information systems arena, said, "But a lot of good jobs in MIS are going wanting."

Where are the good MIS people, and why is this happening? Is it because there are not enough good MIS people? Is it because companies cannot locate the

Continued on page 24

Finessing the small stuff

One man's list of companies that practice the art of product refinement

ASHLEY GRAYSON

I'd like to use this column to encourage vendors that understand how to finesse the small stuff; those that polish the little things that make an otherwise acceptable and possibly ho-hum product downright *useful* and worth recommending.

You know who I mean. . . . The appliance manufacturer whose power cord always reaches the outlet; the auto maker whose air conditioner runs at a setting between frost and not at all; the news magazine that tells you something you didn't already know.

Sometimes such refinement leads to national acclaim, but often it is overlooked because a particular product lacks some superstar quality required by the critics. In the computer industry, such endearing qualities can come from careful, thoughtful design, but more often they show up in successive generations of the product. With today's short development cycles, iterative prototyping may become the new design technique. Prototypes are supposed to be confined to the lab, but some vendors believe in the theory of "Get it out, grab some market share, *then* fix it."

TOM LULEVITCH

Sometimes, if the original product is close enough to market usefulness to make buyers want a better version, this approach works. But be too short on quality, and there won't be a second generation.

The nature of the product may also set limitations: You might be able to engineer by iterative prototyping with a laptop computer product, but you can't do it with a suspension bridge.

I applaud companies that prefer the bridge approach of doing it right the first time. For consistent elegance of design and execution, the award has to go to Hewlett-Packard Co. I've used a number of its products during the last few years, and they not only always work fresh out of the box, they work the way you expect them to work.

Nothing is counter-intuitive or oddball. When first released, HP's laptop computer had no sharp edges to tear your clothes or openings for dust or tobacco to enter and contaminate the innards. The laptops that did are no longer around.

HP printers don't make loud noises, leak ink or create dust. I've also taken a number of HP products apart and found them to be just as carefully constructed on the inside. Their Intel Corp. 286-based personal computer, the Vectra, is a case in point. I've used one almost daily for more than two years and never suffered a failure.

There are other ways to finesse the small stuff, such as solving the problem before anyone notices it and solving the wrong problem. Digital Equipment Corp. deserves mention in both of these categories. The first is for developing a solution — delivering on-line access to a controlled data base — before anyone noticed the problem.

Local-area networks of PCs and workstations are getting all the attention because of their difficulties in giving end users access to the corporate data base maintained by the MIS department. This problem is the one addressed by DEC's VAX Information Center and earlier "in-house time-sharing" products. The Decsystem-10 provided on-line capability in 1972, except there were no micros to talk to, only minis.

DEC's second award is for best solution to the wrong problem. The Rainbow was an elegantly overengineered hardware solution to the perceived software dilemma of CP/M vs. MS-DOS. DEC's traditional New England attitude of never discarding that which has intrinsic value apparently misled the company to design a system to salvage CP/M when the market was willing to bypass or ignore it.

The industry should study this misadventure carefully while it considers what to do about MS-DOS, OS/2, Windows and so on.

Who else fine-tunes the small stuff? Microsoft Corp.'s MS-Word 3.0 runs on both the IBM Personal Computer and Apple Computer, Inc.'s Macintosh. This lets me exchange complex documents with my Mac-fanatic associate. Here's a program that bridges hardware differences to everybody's benefit.

From a technical standpoint, MS-Word is one of those few programs that never run out of features when you need to do something difficult. We've laid out camera-ready copy for more than a thousand pages of technical manuals and never needed more than MS-Word. The product's slickness comes from being able to invoke additional features when the problem requires it. Too many software programs require you to know a lot before you can do a little.

Last but not least, Peter Norton Computing's Commander is the best bit of refinement of the Human/DOS interface I've seen. This small program makes DOS easy to use without replacing it with another massive system that has to be learned.

A perfect demonstration of the Less is More School of

Continued on page 24

Grayson is the founder of ADG, a San Pedro, Calif.-based organization that develops sales tools and programs for high-technology companies. Having spent 11 years marketing large systems for Digital Equipment Corp., he now works extensively with IBM-compatible micros.

Call it anything but a conspiracy

CHARLES P. LECHT

We have recently been treated to two events that cannot help but cause me to wonder who is kidding whom on the international trade issue. The first involves the alleged sale of computer systems by Toshiba Corp. to help the Soviets build quieter submarine propellers; the second involves the recent announcement by the Department of Commerce that it may fully lift the U.S. trade sanctions imposed upon certain Japanese products, including personal computers, small color television sets and hand-held power tools.

Together, these events confirm my feeling that there is no conspiracy afoot in the U.S. in its dispute with Japan on international trade in the computer industry, only ineptitude. In the case of the alleged sale of computers and software to the Soviet Union in violation of rules set down by the Coordinating Committee on Multilateral Export Controls (COCOM), we have every reason to be alarmed if it is true. However, it is not that sorry fact that sparks my interest; it is the results we seem to be obtaining by our reaction to Toshiba's alleged misdeed.

In the trade arena, the announcement by the Department of Defense that it decided to cancel an order for approximately 90,000 Toshiba laptops because the company was judged to be violating COCOM rules, seems far out. If it had been nine, 90 or even 900, I might have simply ignored the laptop order cancellation. But 90,000? In view of the hullabaloo concerning Japanese/U.S. trade, people may well wonder what the deuce was the DOD doing buying 90,000 computers valued at more than $100 million from Toshiba.

Morbid entertainment

Was there no U.S. company that could fulfill the DOD requirement? Or was the Toshiba offer so good that it couldn't be turned down? And are we to be treated to the morbidly entertaining phenomenon of yet another Japanese-industry dumping charge levied by our government against Toshiba for selling so many of its excellent laptop computers to the same government at what appears to be a very favorable price? As I reckon it, the price we were to pay for each had far less profit in it for Toshiba than for the DOD.

The action taken by the Senate to ban the sale of Toshiba products in the U.S. — except those deemed vital to our national defense — is of questionable benefit to our national interests, but is unquestionably bad for U.S. consumers. This decision will ensure the uninterrupted flow of Toshiba products to the DOD, but a cutoff of consumer products and spare parts to the U.S. public. If the Air Force selected the Toshiba laptop instead of anything made in the U.S. to grace 90,000 of its laps, we cannot help but notice that U.S. consumers have been left with second best by the prohibited sale of the product.

Sorry sight

But the larger issue remains unaddressed: the effect on future U.S./Japanese defense relations.

> THERE is no conspiracy afoot in the U.S. in its dispute with Japan on international trade in the computer industry, only ineptitude.

The photograph of a group of U.S. politicians hacking away at a Toshiba radio that graced the front pages of the worldwide press presented a sorry sight indeed, but not as much for Toshiba as for the politicians and the U.S.

Whatever they intended to achieve by this act posed and paid for the phony image of a split between the U.S. with its No. 1 defense ally, the ultimate result they will obtain can only serve to encourage the Soviet Union to continue to press forward to achieve a real split.

That a Toshiba subsidiary was engaged in an unwarranted sale to the Soviet Union may be true. That Toshiba seems to have admitted the deal was made and has taken punitive action toward those involved, is unquestionably true; the corporation's chairman and president have resigned.

But we may still have cause to wonder if the story is exactly as we've been told. Why? First of all, Japanese companies have found it convenient to quickly admit their guilt, whatever the charge, in lieu of arguing their

Continued on page 24

Lecht is chairman of Lecht Sciences, Inc./Japan, a Tokyo-based software think tank specializing in graphics. He is also an elected public member of the Hudson Institute and a free-lance writer on science topics.

Conspiracy

CONTINUED FROM PAGE 23

cases in what they perceive to be a kangaroo court in their largest marketplace.

Second, the protest caused by the murder of innocent U.S. sailors in the USS *Stark* affair pales in comparison with the uproar we have witnessed in the Toshiba incident, so we cannot help but wonder if trade, and only trade, considerations motivate the politicians that advise us in this case. Where were they after the *Stark* was attacked? Why was an "Excuse me" enough for these "patriots"?

Third, the notion that the Soviets had no alternative but to buy the Toshiba equipment seems highly unlikely to me; they didn't send men into space, explode hydrogen bombs and build atomic subs using an abacus.

Whatever the case, even if the event did take place as reported, and the harm that has been done is as we have been told, we would do better by focusing on how to avoid the situation in the future than trying to correct the past. Toshiba, one of Japan's premier science and engineering companies, isn't going to collapse because of the affair.

Regarding the sanctions issue, it is not the efficacy, or lack thereof, of the Department of Commerce's action to impose sanctions on Japanese industry that caught my eye this time. It was the announcement that the Commerce Department may just lift those sanctions if prices of Japanese-manufactured chips continue to rise, both in the U.S. and abroad. Great incentive for the people of the U.S.

First of all, the value of the sanctions, when viewed as a percentage of the value of overall trade between Japan and the U.S., could hardly have more than political meaning. They don't show up until the fourth decimal place, which assuredly is less than the margin of error in computing the trade volume. Clearly the sanctions were intended to feed the emotions of those in the U.S. who, for lack of an acceptable cause, blame their economic ills on Japanese industries.

Second, by offering a phony punishment of Japanese industries and a real one for U.S. consumers in the form of price increases, those perpetuating this myth show disrespect for the intelligence of the U.S. citizenry. Apparently, we are supposed to cheer the prospect of paying more for computer systems products than necessary because we are getting back at the Japanese in the process.

In both the trade sanctions episode and the Toshiba affair, we would be hard-pressed to say "planning" is how we found ourselves in these situations. "If you do not know where you are going, you'll probably end up somewhere else" we were told in a book title of the 1970s. We would do well to pay attention to this advice.

We appear to be headed unintentionally into a realm from which there is no escape except through a retreat from inanity. This means making peace with the Japanese high-tech community within which Toshiba plays a vital role and concentrating our efforts on avoiding war with our true adversaries.

The small stuff

CONTINUED FROM PAGE 23

Design, Commander shows a total understanding of how DOS is really used — by anyone, no matter what you are doing.

Other products that enable you to do many things before you have to learn everything include the following: Ansa Software Co.'s Paradox, which permits access to a data base without your understanding anything; Xerox Corp.'s Ventura Publisher, which makes a document look good whether you went to art school or not; and a gaggle of different vendors' laptops that make it possible to run PC software from anywhere you want to be.

Respond to crisis

CONTINUED FROM PAGE 22

right people? Is it because companies do not know how to recruit, select and hire qualified people?

In response to the first two questions, I believe employers should not only look at the major universities but also pay more attention to the smaller private universities when hiring MIS people.

Because of the dynamic nature of the field, smaller colleges and universities are able to react more quickly to the changing conditions of MIS technology by virtue of their size and constraints and offer programs that are more compatible to the industry's current needs. Of course, this spells better qualified MIS personnel.

To shed some light on the third question, some companies and their personnel departments are emphasizing too much importance on people having specific machine skills when they should stress more importance on a person's overall background.

For instance, does one bring solid business skills that relate to the company's present or future needs, as indicated by the skill graph in the article? What is more important — specific machine skills that one can learn through in-house training within a few short weeks, or years of solid business experience that one brings to the marketplace? Corporate America: Wake up before it's too late.

Dale H. Duman
Graduate MBA/MIS student
City University
Portland, Ore.

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SOFT TALK

Charles Babcock

On keeping software soft

There is a persistent theme running through the discussion of software development these days. Developers are trying to take a malleable material — software — and construct a tough, fail-safe structure on which companies may run their business.

And although it must be rigid enough to perform given business functions over and over again, it also must be adaptable. Hence, even after constructing bulletproof systems, we want software to be plastic.

Frederick P. Brooks Jr. caught the flavor of this when he referred to the pleasure of working "in such a tractable medium" in his book, *The Mythical Man-Month.* "The programmer, like the poet, works only slightly removed from pure thought-stuff. He builds his castles in the air, from air, creating by exertion of the imagination. Few media of creation are so flexible, so easy to polish and rework, so readily capable of realizing grand conceptual structures."

Brooks, who oversaw the development of IBM's System 360 operating system, the progenitor to today's family of mainframe operating systems, noted one sentence later in his book that "this very tractability has

Continued on page 30

Found: needles in a haystack

Memorex unstops system's baffling bottlenecks with Blue Line monitor

BY JEFFRY BEELER
CW STAFF

MILPITAS, Calif. — Until last October, the IBM 4381 that internally supports Memorex Corp.'s Communications Group was able to operate at only 20% of its potential capacity. Worse yet, the company was at a loss even to explain — much less remedy — the machine's unacceptably low level of performance.

Today, the same processor is running at 60% to 80% of maximum efficiency, according to Memorex senior systems engineer Randy Sessler.

The change that accounts for the increase in resource utilization is the firm's installation of a real-time performance monitor that runs under IBM's VM/SP. For the past nine months, Memorex has been using Blue Line Software, Inc.'s $8,000 Vital Signs to pinpoint areas of high resource contention or other systems problems so that the organization can take steps to alleviate bottlenecks.

The user organization is currently upgrading to the latest release of Vital Signs, which Blue Line formally announced July 6.

Memorex already uses the systems software's earlier version, which supports real-time displays of assorted performance measures and boasts a modeling capability that predicts the impact of alternative configurations on system behavior.

But now, the Minneapolis-based firm is enhancing its existing VM performance monitor to include a historical reporting capability that aids in the detection of long-term performance trends.

Also included among the enhancements is a menu feature that allows users other than systems programmers to summon data without entering complicated commands, according to Sessler.

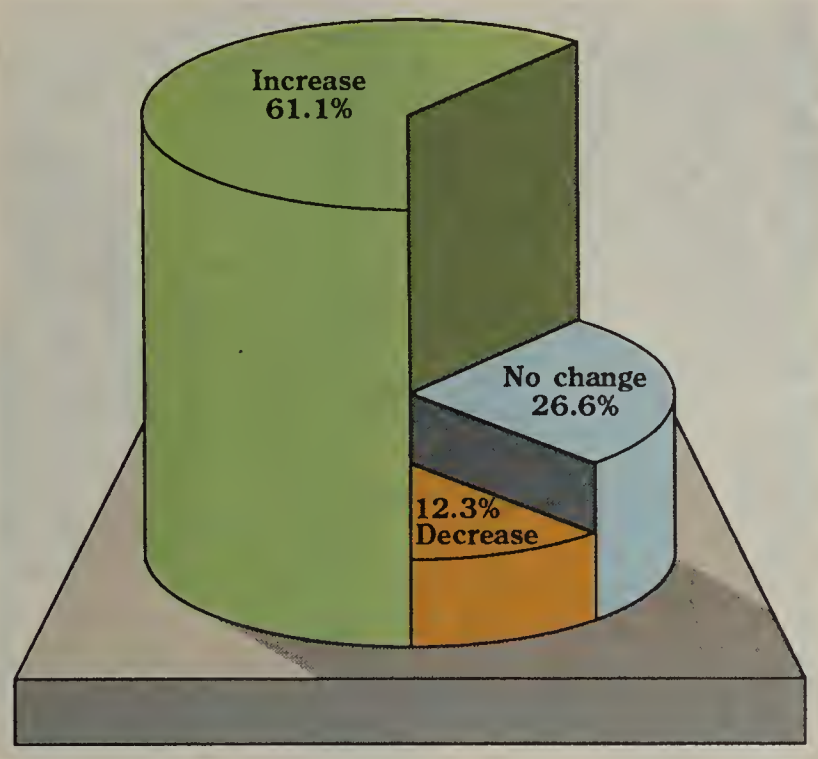
Like IBM's equivalent moni-

Continued on page 29

Data View

Software acquisitions

User spending in the second quarter confirms trend toward third-party vendors



INFORMATION PROVIDED BY A PAINE WEBBER SURVEY OF 1,217 DATA PROCESSING MANAGERS ON BUYING PLANS
CW CHART: MITCHELL J. HAYES

Standard for CASE offered

BY ROSEMARY HAMILTON
CW STAFF

Cadre Technologies, Inc., a maker of computer-aided software engineering (CASE) tools, recently proposed an interface standard that would allow users of different CASE tools to exchange data.

The Providence, R.I.-based vendor has yet to gather support from other CASE vendors, but claimed that this "proactive role" will minimize its engineering efforts. "By doing this, we decrease the likelihood that a new standard will come out from somewhere else that we'd have to adopt," said Lou Reynolds, Cadre's vice-president of marketing.

Cadre demonstrated a prototype interface at the Design

Continued on page 29

Software packaged for 9370s

BY ROSEMARY HAMILTON
CW STAFF

ATLANTA — American Software, Inc. is offering prepackaged versions of its mainframe manufacturing and accounting software for the IBM 9370 departmental system that will cost from 10% to 35% less than its current products, company officials said recently.

American Software said the DS/9370 series, available now, will run under the IBM VSE operating system.

The product line, which includes manufacturing resource planning applications as well as the commonly used accounting packages, will be offered with a number of optional features, but the vendor said it will not tailor the software to a particular customer's needs.

'Fewer decisions to make'

American Software has offered its other mainframe products with optional features and a customization service. The DS/9370 packages, however, are "for users that want fewer decisions to make and a lower

Continued on page 30

Inside

Tandem seeks leadership role in CIM market

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Tandem Computers, Inc. claims it can put its own experience to work for customers in the developing market for factory computer systems.

At the Advanced Manufacturing Systems show here last month, Tandem positioned itself as a systems integrator for end users in the computer-integrated manufacturing (CIM) arena. The company outlined its systems integration architecture, called the Tandem Integrated Manufacturing Environment (TIME).

The architecture will combine Tandem hardware and systems software with third-party applications software solutions, Tandem said.

Making TIME

"The thing that really drove the development of TIME within Tandem was that our systems were able to track the things we made, instead of using the paper tags attached to products," said John Despotakis, manager of manufacturing industry marketing for Tandem. "It will track our customers' products, whether they are jet engines, printed-circuit boards or pharmaceuticals."

Although TIME packages will not be ready for shipment until next year, they will be based on the Tandem Nonstop fault-tolerant processors, Tandem's Nonstop SQL relational data base management system, a Tandem-IBM Systems Network Architecture communications facility called SNAX and Tandem's new Unix workstation, the LNX processor. Tandem said it will also announce a consulting service for its manufacturing customers, who accounted for 21% of Tandem's 1986 revenue of $768 million.

Tandem decided to sell its own approach to others following a prediction that the need for seamless CIM solutions would grow to a $20-billion plus market in the 1990s. And Tandem's own experience had shown that fault tolerance, a key customer requirement in buying Tandem systems, is also a critical CIM requirement.

"Fault tolerance is a manufacturing requirement," Despotakis said. "We're providing the specifications for three factory environments and then preconfiguring them to fit together with complementary pieces." The three environments are product and process document management, factory control and device control.

Using elements of the TIME system at its Austin, Texas, terminal manufacturing plant saved Tandem nearly $25 million in overhead, an amount nearly equal to 4% of its 1986 revenue of $768 million, Despotakis said.

SAS listens to user demands for efficiency

BY CHARLES BABCOCK
CW STAFF

CARY, N.C. — SAS Institute, Inc. is claiming a 40% performance improvement with an enhanced release of the SAS System for Digital Equipment Corp.'s VAX after users called for efficiency improvements in the burgeoning SAS product.

The performance improvements in Release 5.16 are the result of a 20-member development team's efforts to streamline the one million lines of code now in the SAS System.

Release 5.16 is written in PL/I and assembler; Version 6.0, expected to go into beta testing in late 1988, will be written in C, like the current personal computer version of the base system, SAS spokesmen said.

Granting a wish

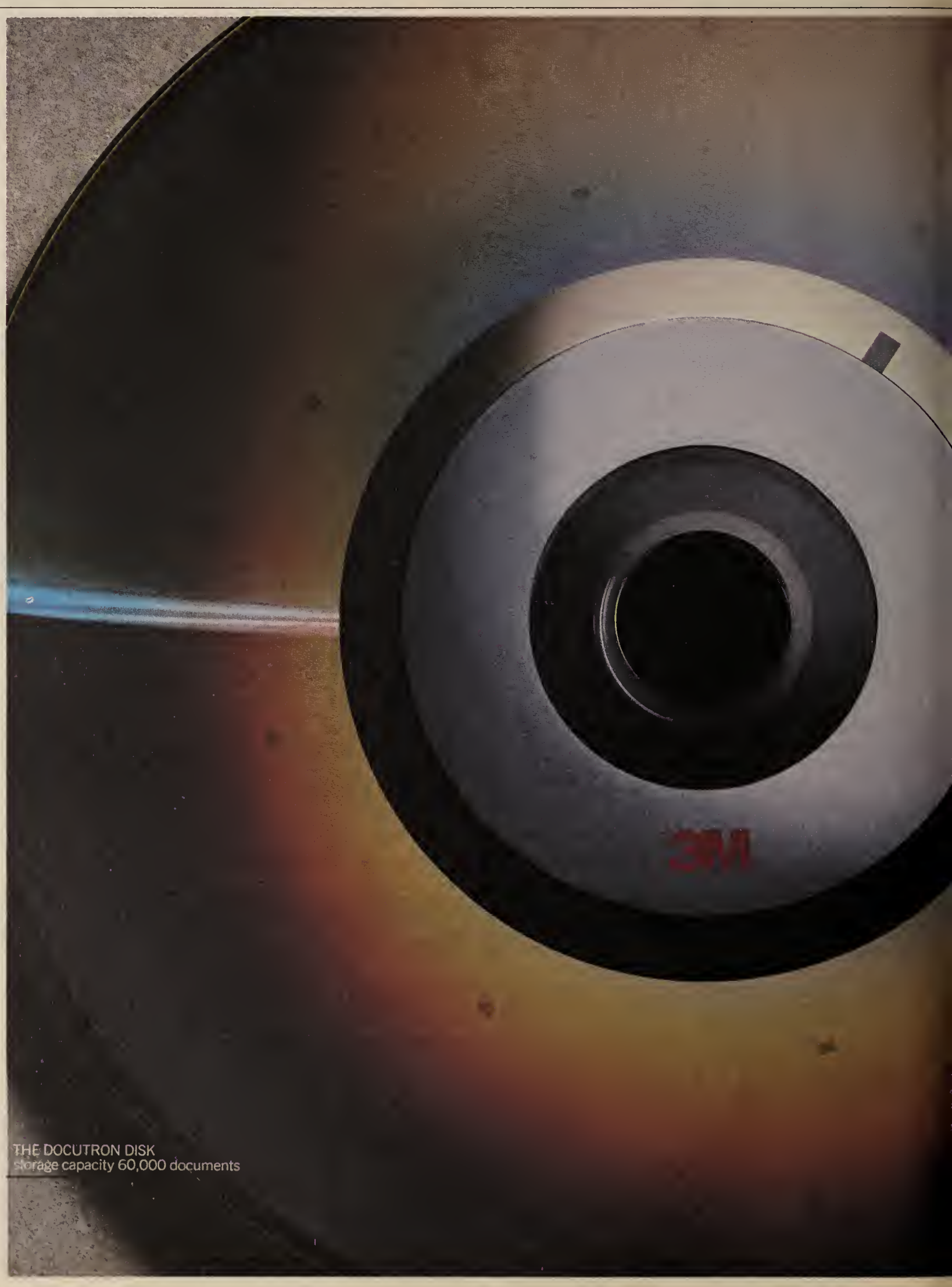
Performance improvements have been a frequently cited wish on SAS Institute's annual list of customer preferences, according to officers of the SAS System Users Group.

Other features of the release include a single-command file transfer method between VMS and an IBM PC-DOS users' version of the SAS System.

A separately priced tool is available to mainframe users in manufacturing to automate statistical analysis in quality control is now available to VAX users. Called SAS/QC, it gathers quality-control information, analyzes it and shows variations within given specifications. It is integrated with other components of the SAS System, company spokesmen said.

Release 5.16 supports DEC's Vaxstation 2000 and VT330 and VT340 graphics terminals, SAS said. A first-year license for the release is priced from $1,500 to $12,000, depending on processor size. SAS/QC is priced from $1,500 to $6,000.

Licenses for the SAS System on the VAX currently number about 1,700. The system still garners about 65% of its revenue from the IBM mainframe world, but sales to DEC users now account for about 20% of revenue and are growing, according to SAS Chairman James Goodnight.



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SOFTWARE NOTES

Information Builders plans first acquisition

Information Builders, Inc. in New York reports that it is is planning to acquire expert system development company **Level Five Research, Inc.** in Indialantic, Fla.

Level Five is the first acquisition by Information Builders, which markets PRL3, an expert system development tool for the Digital Equipment Corp. VAX, and Insight 2+ for IBM Personal Computers and compatibles. Information Builders' Chairman Gerry Cohen said Level Five will help Information Builders offer more decision-support products to its Focus product lineup.

DBMS, Inc. and **Cullinet Software, Inc.** recently decided that cooperation is more profitable than litigation.

Cullinet sued the Naperville, Ill., company over its Developer Workstation, a personal computer-based system aimed at developing Cullinet IDMS/R applications.

The firms' differences have been composed out of court, and now DBMS is on Cullinet's list of registered consultants, DBMS spokesmen said.

Thomas D. Blondi, former vice-president of marketing for **Software AG of North America, Inc.**, has rejoined Sterling Software, Inc.'s **Answer Systems Division** as vice-president of sales and marketing. Blondi was previously with the division from 1973 through 1983.

Relational Technology, Inc. has turned to **Natural Language, Inc.** to come up with a product that will allow users to formulate queries and access the former's Ingres data base with English statements.

Natural Language's product is Datatalker, which translates queries into SQL statements.

Needles

CONTINUED FROM PAGE 27

tors, VMMap and Smart, the Blue Line product collects statistics about key systems performance variables such as CPU utilization, resource waits and I/O as well as paging rates. But unlike its IBM counterparts, which present their numbers in tables, Vital Signs displays its output graphically.

For Memorex, the graphs simplified the interpretation of its 4381's raw performance data and sped the diagnosis of the machine's problems. Within a few days of installing the monitor's first release, "we found that most of our system peaks were occurring on the same disk controller and channel," Sessler recalled. "So we simply added more devices, channels and controllers to our configuration to make sure that the user load is spread evenly across the system."

Considered alternatives

Had Memorex opted instead for a performance monitor that presents its output tabularly, the firm might still have been able to diagnose the cause of the 4381's inefficiency. But the burden of analyzing the resulting reams of raw statistics would have retarded the process and possibly "prevented us from seeing what impact our bottlenecks were having on the system's utilization," Sessler said.

Memorex's purchase of Vital Signs coincided with the start of a systems conversion effort that the company has yet to complete. While the firm was still a subsidiary of Unisys Corp., the Communications Group's VM-based 4381 was used primarily for engineering applications.

Now, however, Memorex is converting the processor into a business-oriented system that will integrate jobs such as order entry, inventory control and the standard accounting functions, Sessler said.

Memorex also uses copies of the performance monitor externally as a sales tool to help its systems engineers spot bottlenecks in their customers' current hardware and suggest alternative configurations to address the problems, Sessler added.

Standard

CONTINUED FROM PAGE 27

Automation Conference, held late last month in Miami, that exchanged data between its Teamwork software and Excelerator, a competing product from Index Technology Corp. in Cambridge, Mass.

Index Technology did not participate in the demonstration, and a company spokeswoman said the vendor has not yet announced its position regarding the proposed interface standard.

The proposed standard is an extension of an evolving user-backed standard in the computer-aided engineering (CAE) world called the Electronic Design Interchange Format (EDIF).

An EDIF users group was formed four years ago to create an interchange standard that would allow users of different CAE systems to exchange data.

The latest version of the proposed standard, EDIF 2.0.0, was recently published and at least two vendors, Mentor Graphics Corp. and Valid Logic Systems, Inc., have announced their intentions to support it.

Keeping

CONTINUED FROM PAGE 27

its own problems."

Nevertheless, he touches on the essential nature of software. Like the potter, the program developer models his object from a malleable substance. Unlike the potter, the programmer will spend a great deal of time keeping it soft. If the software developer wanted permanence, he could cast his product in silicon.

Instead, we want our models of reality, embedded in software, to remain flexible. We want to be able to modify the model as quickly as reality changes. Even if reality doesn't change, our perception of it will, hence, we arrive at an essential requirement for software.

Paul G. Bassett, vice-president of research at Netron, Inc., a Toronto computer-aided software engineering (CASE) tool maker, summed up the problem implicit in this requirement with an apt phrase — brittle software. "Software provides the means, both to approximate reality with dynamic models of arbitrary precision, and to alter them as rapidly as our perceptions change . . . [it] is the ultimate modeling medium.

"Unfortunately, the effective malleability of software has not been realized in practice. Lack of adaptability is the single most important factor underlying the current 'crisis' in the software industry. While much effort has been devoted to representation, little work has been done to automate customization and evolution," Bassett wrote in a paper.

Thus, those who produce application generators find themselves offering systems that can produce new models of reality quickly. But their clay is the quick-frozen type, one that forces the potter to adapt to its routines and language.

No one tool will help

Likewise, CASE tools speed development of applications, but once developed, no one tool will help us maintain and adapt applications to unanticipated change. To make significant changes, we have to go back and use a whole battery of tools all over again, and frequently they do not mesh.

"Curiously, like metal fatigue, the more you flex software, the more brittle and fragile it seems to get. In spite of our best efforts, subtle inconsistencies creep into hidden nooks and crannies of the code. To make things worse, once the original implementors depart, no one quite understands how certain modules work anymore," Bassett wrote.

Questions that go unaddressed in the plethora of products claiming to aid software development are: Can we incorporate adaptability into our systems? Will they be easy to maintain or merely quick to develop? Do the tools with which we design them help us modify them? How do we keep software soft?

Babcock is *Computerworld's* senior editor, software & services.

CPU tools

CONTINUED FROM PAGE 27

cost," said Paul Di Bono, vice-president of marketing.

For instance, the prepackaged version of American Software's Manufacturing Management System will typically carry a license fee of $220,000, according to Di Bono.

A comparable system for other IBM 370 mainframes costs $360,000, Di Bono said.

Single software prices affected

Price differences affect single software modules as well, American Software said. A typical accounts receivable module is priced at $75,000 as part of the DS/9370 series, while the module costs $110,000 for larger IBM mainframes.

Di Bono said that the DS/9370 packages will not be available for the IBM VM operating system, even though IBM currently is heavily promoting VM for the 9370 systems.

"At some point, if they make VM suitable for a heavy transaction processing environment, then we will follow that direction," he said.

NEW PRODUCTS

Systems software

Honeywell Bull, Inc. has introduced **Software Release 3000** (SR3000) of its GCOS 8 operating system for DPS 8, 88 and 90 computers.

SR3000 adds support of a personal computer link and Cobol 85 and Ada programming languages.

The Personal Computer Interconnect (PCI) link is host-access software. It provides a window manager, graphics, terminal emulation and script processing.

License origination fees for the GCOS 8 operating system range from $2,000 to $12,000. Monthly license fees range from $500 to $4,700. PCI costs $495. The license origination fee for the Cobol 85 compiler costs from $840 to $1,000. Monthly license fees range from $420 to $500. Initial license fees for the Ada language system cost from $40,000 to $50,000. Annual license fees range from $12,000 to $15,100.

Honeywell Bull, P.O. Box 8000/A-79, Phoenix, Ariz. 85066.

Applications packages

Sotas, Inc. has enhanced its **Fixed Assets** accounting system for Wang Laboratories, Inc.'s VS computer systems to include redesigned menus, prompts and data-entry screens and to address the first phase of the Tax Reform Act of 1986.

Fixed Assets accommodates new depreciation methods such as diminishing balance, accelerated cost recovery and straight-line mid-month convention. Other modifications include real-time inquiry into both company and individual asset data, on-line navigation through the entire Fixed Assets system and rewritten procedure language.

The new version of the Fixed Assets accounting package is priced from $8,000 to $25,000.

Sotas, 192 Merrimack St., Haverhill, Mass. 01830.

Languages

Language Processors, Inc. has ported its **LPI-PL/I** compiler to the Apollo Computer, Inc. Domain workstation.

LPI-PL/I reportedly was designed for use as a conversion tool and is a full implementation of the ANSI PL/I X.374 1981 General Purpose Subset. It includes extensions for compatibility with mainframe dialects of PL/I to facilitate software conversion. According to the vendor, LPI-PL/I allows users to port PL/I applications running on other systems, such as IBM mainframes and Digital Equipment Corp. VAXs, to Apollo workstations.

LPI-PL/I is priced at $2,000.

Language Processors, 400-1 Totten Pond Road, Waltham, Mass. 02154.

Utilities

TRW, Inc. has introduced a system exerciser and utility package that provides on-line hardware testing and failure reporting capabilities for Digital Equipment Corp.'s VAX-11/700 series of computers utilizing DEC's Ultrix or the University of California at Berkeley's Software Distribution operating system software.

TRW USE includes a CPU test as well as exercises that identify malfunctioning DEC and plug-compatible peripheral devices. It also contains utilities for disk and tape-drive alignment. It operates on-line and resides on approximately 180K bytes of disk space. Normal processing operations can continue while the system is being exercised.

A single license of TRW USE costs $3,795 per copy. A general-use, multisite license costs $57,995.

TRW, 420 Hudgins Road, Fredericksburg, Va. 22401.

Target Systems Corp. has enhanced its **Target Calendar** quality-time and calendar-management software for Digital Equipment Corp. VAX/VMS systems.

The vendor said a new add-on software product, called Target Notify, provides Target Calendar users with an event notification system that automatically reminds users of the next scheduled event.

The vendor also announced that support for DEC's Decnet is now available for Target Calendar. For multisystem sites, Decnet support provides users with access to Target Calendar data files that reside on other nodes.

Target Calendar is priced from $395 to $795.

Target Systems, 33 Boston Post Road W., Marlboro, Mass. 01752.

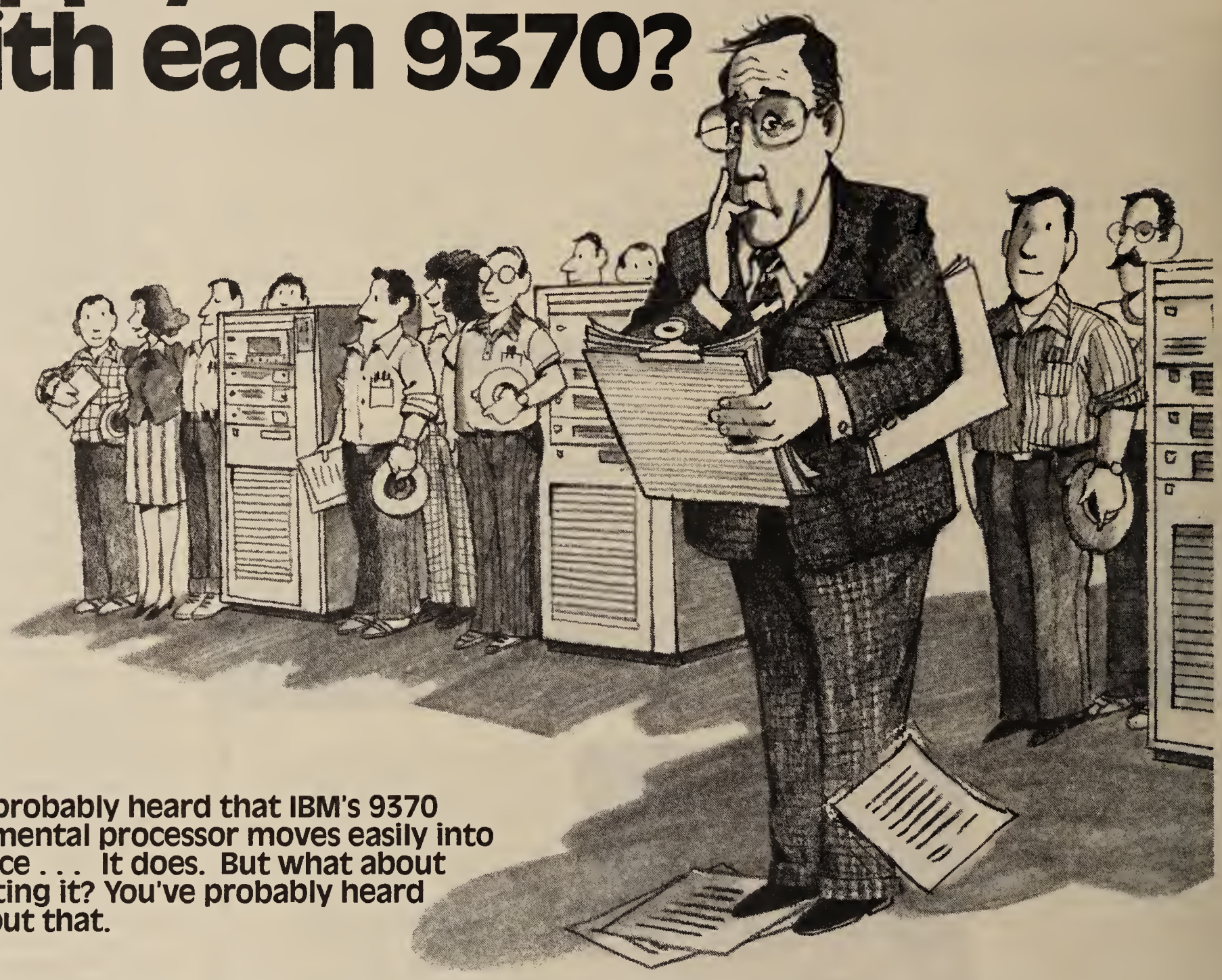
Development tools

Enter/Act, a software package said to provide developers of interactive applications running under Unix with utilities for command processing, window management, menu generation and on-line Help, has been announced by **Precision Visuals, Inc.**

Enter/Act automatically generates code to handle the command prompts, command processing and program branching once the developer has specified the flow of control through the program, the vendor said. It supports windows even on nongraphics terminals such as the Digital Equipment Corp. VT100. Prices range from $13,000 to $32,500.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

Are you prepared to supply a technical staff with each 9370?



You've probably heard that IBM's 9370 departmental processor moves easily into the office . . . It does. But what about supporting it? You've probably heard less about that.

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SMALL TALK

William Zachmann

Unpacking OS/2 kit bag

As far as I know, this is the first column in a computer publication written under OS/2, the new operating system from Microsoft Corp. and IBM due out next year. But since I didn't have a protected-mode version of my favorite word processing software, I had to be content to construct this column using Wordperfect Corp.'s Wordperfect running in OS/2's compatability on an IBM Personal Computer AT compatible from NEC Corp. called the APCIV.

Without a doubt, OS/2 is the most important software event of this year thus far. The first form in which anyone outside of Microsoft and IBM can gain access to OS/2 is the $3,000 Microsoft OS/2 Software Development Kit, which I'm currently using. It includes all the tools required to begin developing OS/2 applications along with a prerelease version of Microsoft's MS OS/2.

Other micro vendors, such as Compaq Computer Corp., say that they will offer Microsoft's MS OS/2 for their systems

Continued on page 35

Expert system stalks killers

Developed to test rapid prototyping vs. knowledge acquisition

BY ALAN J. RYAN
CW STAFF

Serial killer: One who wantonly commits multiple murders over a period of time, often over a large geographic area, without any apparent reason or pattern.

TROY, N.Y. — A hunter tracking an animal can follow signs like tracks and broken twigs. But police hunting a serial killer are seldom so fortunate.

To ease the search, William Wallace and a former student, Paul Gutwald, at Rensselaer Polytechnic Institute (RPI) created an expert system to help officials track serial killers.

In most expert systems, a knowledge-acquisition process involving much research, inquiry and observation is used to create the system's knowledge base.

However, in an area like tracking serial murderers that boasts few experts, a knowledge base can be extremely difficult to build.

Wallace, chairman of the department of decision sciences and engineering systems at RPI, and Gutwald, who works in the artificial intelligence group at General Motors Corp. in Detroit, came up with Serial Murder Analysis and Recognition Techniques (Smart) — and put rapid prototyping to the test.

They constructed the system for use on the IBM Personal Computer AT under Scotts Valley, Calif.-based Borland International's Turbo Prolog development tool. The purpose of rapid prototyping, Wallace says, is to

Continued on page 34

Small firms' PC spending nose-dives

BY ALAN J. RYAN
CW STAFF

WEST HARTFORD, Conn. — The number of small businesses planning to buy microcomputers and supermicrocomputers took a 48% plunge from 1985 to 1986, according to a study conducted by Focus Research Systems, Inc., a subsidiary of Dun & Bradstreet Business Marketing Services.

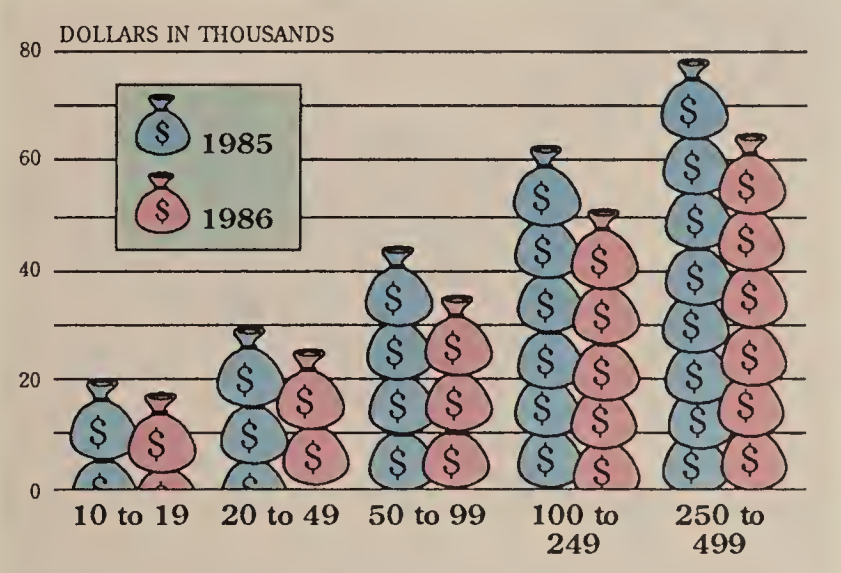
The findings were based on more than 100,000 interviews conducted by Focus Research. For companies with revenues between $2 million and $50 million per year, average budgets for new systems dropped 17% and total planned expenditures fell 57% from 1985 to 1986.

Small-business microcomputer systems budgets dropped

Continued on page 34

Micro purchases

Small businesses budget less for new systems



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART: MITCHELL J. HAYES

Ansa chief addresses 386, OS/2

Ansa Software boldly broke into the microcomputer software industry in 1985 with the release of Paradox, a data base product aimed at stealing market share from Ashton-Tate's Dbase line.

The venture capital-backed firm, which last week agreed to be acquired by Borland International, is trying to establish a beachhead in the local-area network data base market with its latest release of Paradox. Ansa is also developing a version of Paradox that takes advantage of the Intel Corp. 80386 processor but does not require OS/2, the unreleased operating system from IBM and Microsoft Corp.

Ansa President Ronald S. Posner, a former Ashton-Tate executive vice-president, spoke with *Computerworld* Senior Editor Douglas Barney prior to the Borland acquisition about competition with Ashton-Tate and the changing complexion of the data base market.

What is the biggest challenge for software devel-

Continued on page 40

Inside

PC spending

CONTINUED FROM PAGE 33

from an average of $18,500 in 1985 to $15,900 in 1986 for companies with 10 to 19 employees. For companies with 250 to 499 employees, small-system spending fell from an average of $76,700 in 1985 to $65,100 in 1986, the study found.

False impression

Gene Talsky, president of Professional Marketing Management, Inc. (Promark) in Old Lyme, Conn., said that as major corporations continue to buy small systems, a false impression is given that companies of all sizes are making computer purchases.

As smaller firms cut back on purchases, the impact is passed on to value-added resellers (VAR), Talsky said. "An important thing to remember is that the drop in the small-company budgets represents roughly the margin that a VAR earns."

One analyst agreed with the thrust of the Focus Research findings but disagreed with the degree of decline. "I'm sure buying is down a significant degree," said analyst Aaron Goldberg, a vice-president of microcomputer services at International Data Corp. (IDC) in Framingham, Mass. But Goldberg said he has not seen buying plans decline by 57%.

Goldberg said a decrease in purchasing dollars in small companies could be attributed to several factors, including the purchase of lower priced systems.

From 1984 through 1986, VARs took a beating; many are now out of business. The distributors and manufacturers also felt the heat, said John Worthen, president of Focus Research. "The good news is, I think we now have a healthier set of organizations and a healthier overall manufacturing and distribution vehicle than we did three or four years ago."

The study listed 12 vertical market segments that are becoming saturated. At least 60% of the firms in each segment have installed small systems, according to Focus Research. These segments include business and professional organizations, accounting, public relations and engineering/architecture firms, automotive dealers, insurance agents, utilities, insurance companies, mining, brokerage firms, miscellaneous and business and professional services.

Although 60% of those businesses have computers installed, Promark's Talsky said, much of that installed base is in the larger companies. Many smaller companies may never make a computer purchase, he said.

Low saturation points

Additionally, the study listed 11 vertical markets that are saturated less than 40%, including grocery, liquor and clothing stores, restaurants, hotels, personnel services, car repair businesses, gas stations, physicians, health services and building maintenance.

Prospects for the overall computer market are much better than the demand in the small-business segment would indicate. IDC's Goldberg predicted that the overall personal computer market will grow approximately 8%.

IBM's Personal System/2 will play a part in future buying trends, Goldberg predicted. "The PS/2 will likely discourage some spending now, due to the problem that there is an issue in terms of what product to buy. Once everything with PS/2 and OS/2 comes together, you'll see a real desire on the part of customers to consider something new."

Promark's Talsky called the PS/2 "a nonissue in the small-systems marketplace. It is strictly a corporate issue."

Expert system

CONTINUED FROM PAGE 33

get into a field using basic information on procedures and systems. "It would be the kind of information a young detective might get in a handbook . . . very rudimentary," he says.

With the "book knowledge" in place, an interface was built. "We spent a lot of time on scenarios because we didn't have a data base," Wallace says.

Originally, "We thought to catch the murderer, you needed to create a model of him" with the system, Wallace says. "But we found that detectives actually work from a reservoir of knowledge they build up based on the victims. They look very carefully at the characteristics of the victim."

At first, the developer says, the law enforcement community was skeptical. "It was disbelief that we could in any way, shape or form even help a detective," Wallace says. To date, the system has not been used in real applications; it is in its prototype stage and is being assessed by police officials in New York state.

Wallace says that while the system probably could not help an experienced detective, it is geared to be an operational tool for those who have not experienced that kind of activity — often officers working in smaller towns.

Users of the system work through a series of screens after a murder takes place. The information provided reportedly gives the user helpful information on what questions to ask and who to ask them of in order to find out if this murder might be linked to others.

"Our hope is that we prevent another murder," Wallace says. Smart lets a smaller community tie into a large data bank, which would likely reside in the criminal justice divisions of state police forces.

OS/2 kit

FROM PAGE 33

under their own labels, presumably around the same time. There is no current indication, however, that Microsoft will sell OS/2 to users directly. On the contrary, it appears likely that Microsoft will continue to sell its operating system software only through the systems vendors (its OEM customers), as it has done in the past.

The Microsoft MS OS/2 Software Development Kit is primarily intended to help software developers get started on applications that make use of the new features of OS/2, such as the full protected-mode address space of the Intel Corp. 80286 microprocessor and multitasking. In the first instance, this means software developers at firms that develop PC software to sell.

Commercial users of PCs have also shown a high level of interest in the OS/2 development kit. The vastly lower ratios of price/performance of PCs, relative to traditional mainframe and minicomputer systems, make it economically desirable to put serious applications on PCs whenever possible.

What the Software Development Kit offers — albeit at a fairly stiff price — is an early opportunity for users to get their feet wet with OS/2.

Currently, the Software Development Kit is shipping without the OS/2 Presentation Manager, an update of Microsoft Windows that is closely integrated with OS/2. It is scheduled to follow next month.

The kit includes the Microsoft OS/2 LAN Manager, a compatible upgrade to the MS-Net software under DOS 3.0 and higher. This includes additional capabilities for higher level resource sharing over local-area networks. Development tools include the Microsoft C Optimizing Compiler, the Microsoft Macro Assembler, Microsoft's popular Codeview debugger and a variety of utilities.

The Microsoft OS/2 Software Development Kit is more than just the software and documentation, however. Its $3000 price also allows one user to attend a Microsoft OS/2 Developers' Conference. Purchasers of the development kit also receive updated releases of the software as they become available.

The final element of the kit is a one-year subscription to Microsoft's Direct Information Access Line System, which is an on-line, dial-up technical-assistance service There probably isn't a better way to keep up with what's hot with OS/2.

The OS/2 Software Development Kit is currently slated to be supported by the IBM Personal Computer AT, the Compaq Deskpro 286 and 386, Portable III and Portable 286 and Zenith Electronics Corp.'s Z-241, Z-248 and Z-386.

Even with slightly less than one week's experience with the Microsoft OS/2 kit, there is no doubt in my mind that it offers an excellent opportunity for anyone who wants to get an early start on OS/2 and is willing to pay the price.

Zachmann is vice-president of research at International Data Corp.

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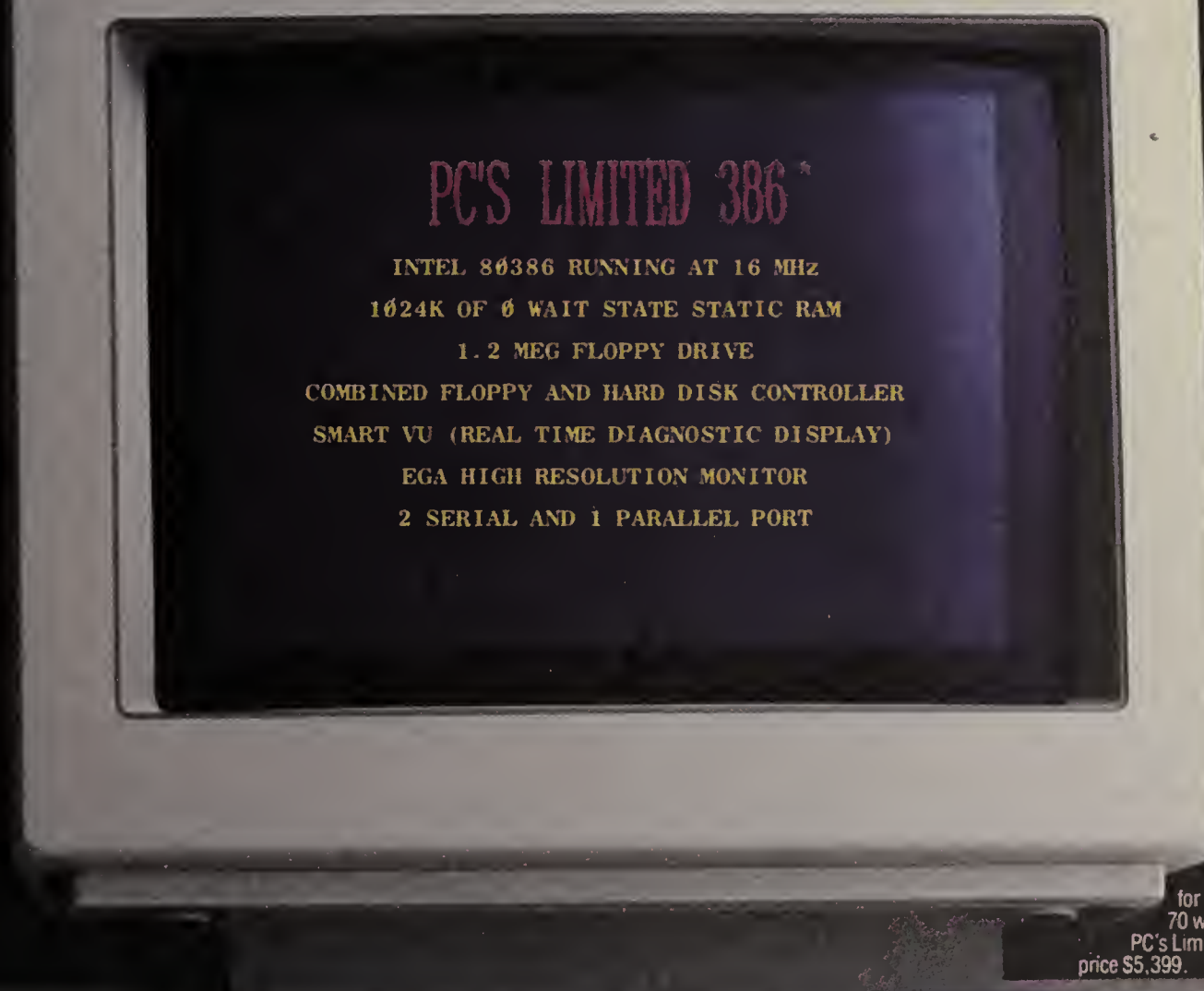
So to all of you who already bought Compaq's 386, you have our condolences.

And to those of you who are thinking of buying one, you have our phone number: 1-800-426-5150.



*PC's Limited 386 Benchmark Study is available upon written request.
**Based on current suggested retail price, effective May 1st for most comparable system: Compaq Model 70 with a 70 Meg hard drive list price $8,699. PC's Limited 386[16] with a 70 Meg hard drive list price $5,399.

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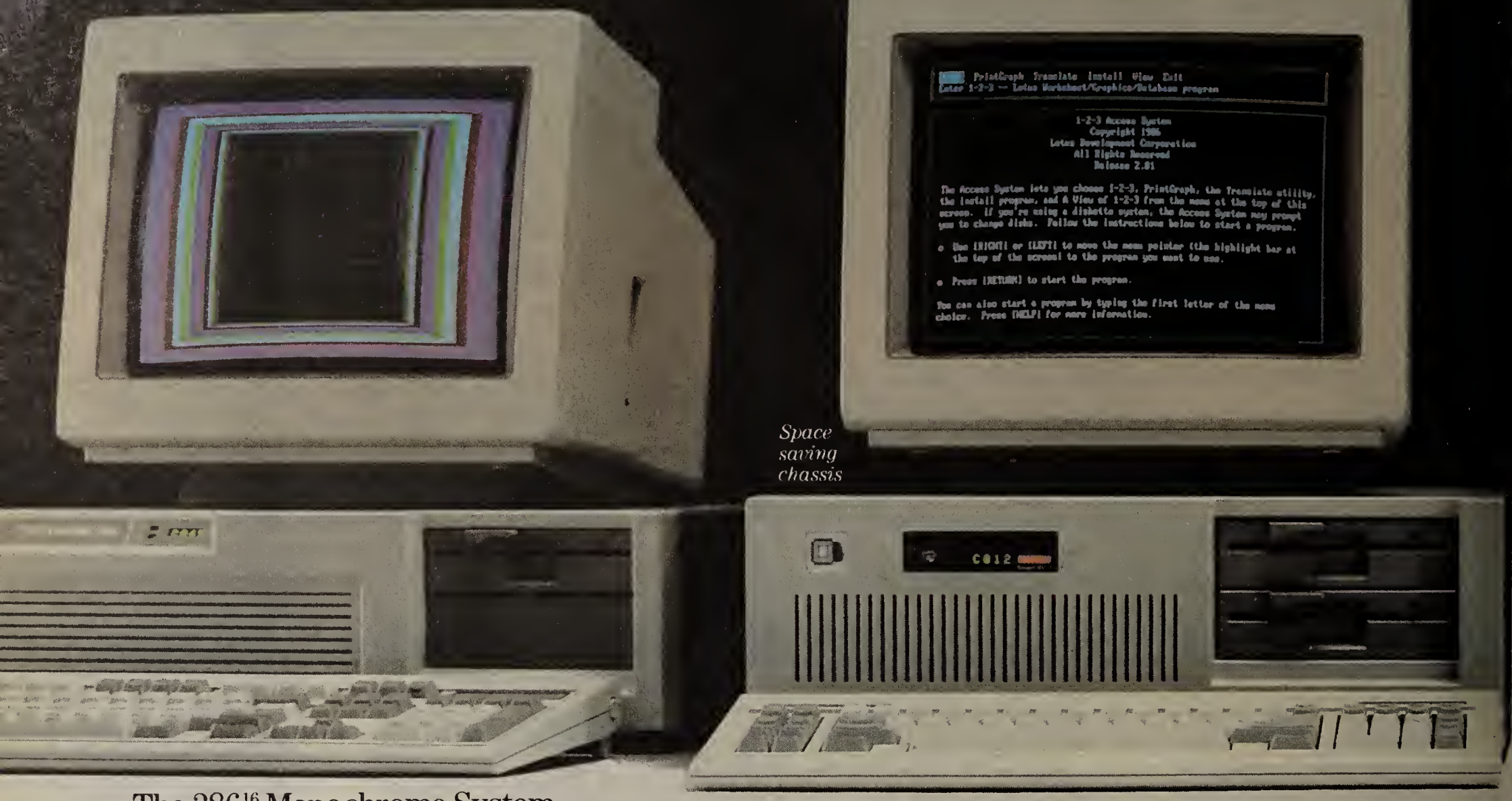

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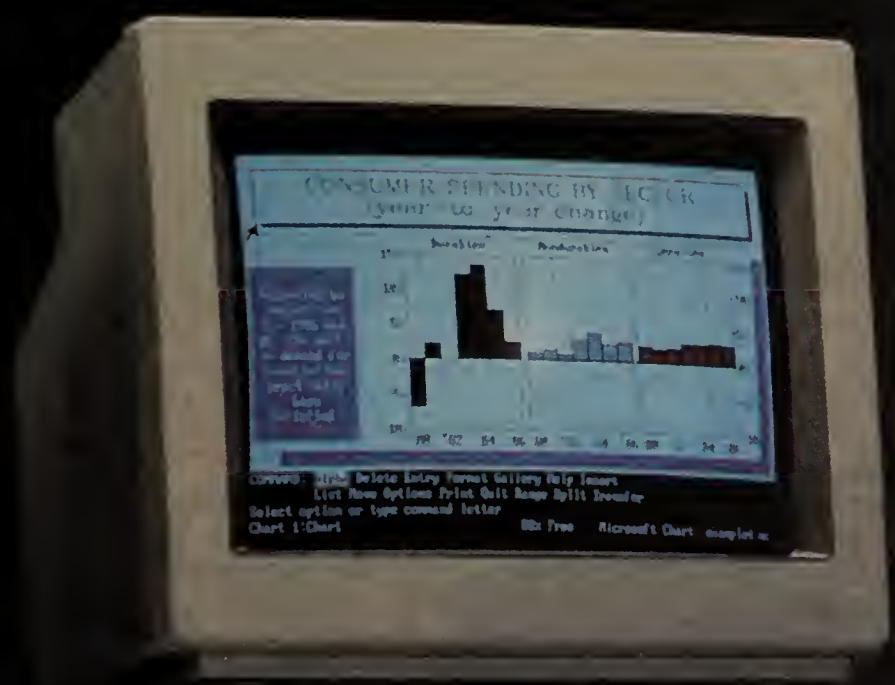

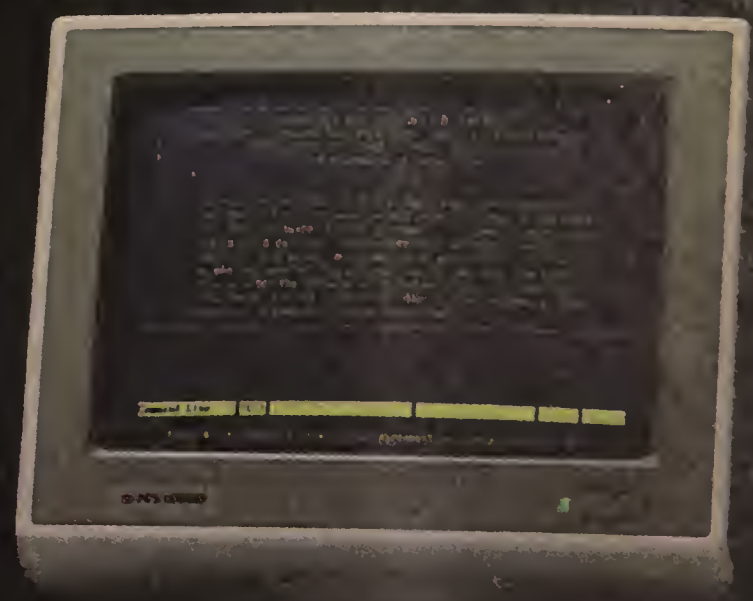

Standard chassis

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With a 40 Meg, 40 MS hard drive and standard chassis $2,649

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Ansa chief

FROM PAGE 40

opers in entering the OS/2 market?
The biggest challenge is making sure that whatever you build under OS/2 actually offers true end-user benefits. If you are not careful, you could build an OS/2 product that actually slows down the performance of the product.

What is the logic behind moving to 386-based alternative operating systems?
If we can improve the performance of Paradox three to four times, which we think we can, that is a clear end-user benefit. Right now, we do a lot of code-swapping. If OS/2 applications don't start to appear until the end of 1988, that gives us a clear 12-month or longer head start. And since OS/2 may actually slow down the product because of protected mode, we might have that performance benefit there for a long time.

We are focused on what we can do today. You don't have to wait for all the great things that are coming down the road. It has been my experience that the promises of how great it is going to be in the future always take two to five years longer than anyone predicts to realize.


Ronald S. Posner

Will people who move to a 386 implementation need to move to OS/2?
They may not need to or want to. You will see many end users who stay with the 386 in the [Microsoft] MS-DOS environment by using the extenders because they realize that they are getting all the benefits of OS/2. The only other benefit is multitasking, and not all users necessarily feel they need multitasking.

What is your opinion of Unix?
Unix is a growing market that is here to stay. We are getting a lot of requests from some of our OEMs, like Tandy Corp. and AT&T, to do a Unix version, and I suspect before too long we will announce a Unix version.

Unix has all the features of OS/2, although it is more cumbersome.

What are your expectations for the network market?
I think by the end of this year, we will be shipping more network versions of our product than Ashton-Tate will be shipping of theirs. Their product doesn't work well on the network, and they just aren't emphasizing it from a marketing point of view.

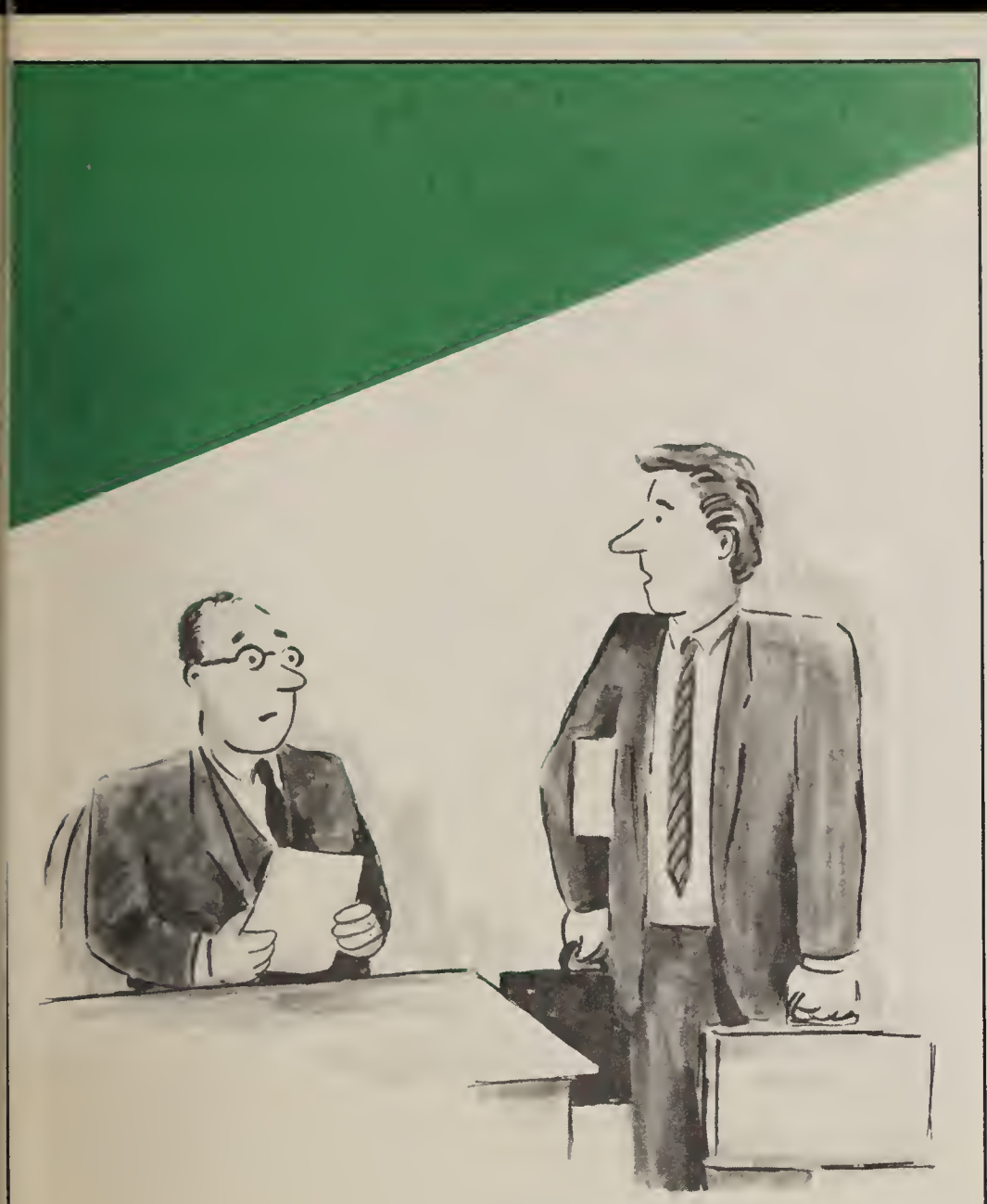
Who is buying Paradox on a network?
It is mostly end-user departments with a recommendation from MIS or the information center manager.

What is your opinion of the concept of a distributed data base?
What is important for us is to be able to get at data on other environments. Our focus is to allow the user to access data wherever it resides in the corporation and bring it down to the the personal computer. We don't need to have Paradox running on the mini and mainframe to do that.

How serious do you think IBM is about the microcomputer data base market? The company detailed the Data Manager component of its OS/2 Extended Edition, and that appears pretty ambitious.
I think IBM is serious about it, and it is ambitious. IBM will do well with the pieces that tie into the operating system. If you look historically at IBM with their data base extension on their larger systems, they have done well with the pieces that are heavily tied in with the operating system component. They haven't done well with any of their end-user application pieces. We envision the market splitting, with IBM and others focusing on the back-end data base functions, the extensions to the operating system and the server functions. We will continue to focus on the front end, or the end-user component. In fact, we have some discussion going on with IBM right now about how we will marry the front end of Paradox to all their back-end activity.

Do you buy the argument that with the OS/2 Extended Edition, IBM is back to bundling?
I am not concerned with IBM bundling, and it is not clear that they are bundling. They are charging a hefty price for the OS/2 Extended Edition.

What does Ashton-Tate have to do to stay on top in the micro data base market?
The biggest single challenge they face will come when they can no longer just add on features to Dbase and have to completely rewrite it to take advantage of OS/2 and the Presentation Manager. It requires a new technology. The question is: Can they keep the applications compatible? With new technology, they may not be able to keep that compatibility. In fact, I suspect they won't, because applications under MS-DOS are not going to be fully compatible with the Presentation Manager. Will the incompatibilities make it a whole new ball game and put everyone on a level playing field?



"I'm sorry, Mr. Littleton. But when they offered me my own subscription to Computerworld, I took the job."

NEW PRODUCTS

Systems

A portable personal computer featuring a 10M-byte internal hard disk drive and offering from two to five hours of battery operation on a single charge has been announced by **Zenith Data Systems**.

The **Z-183** includes an Intel Corp. 80C88 16-bit processor operating at 8 MHz, switchable to 4.77 MHz. It comes with 640K bytes of random-access memory (RAM) and 16K bytes of video RAM. Other features include a 10½-in. diagonal LCD, serial and parallel ports, 5¼-in. external floppy disk drive interface and Microsoft Corp. MS-DOS 3.2. The Z-183 costs $3,499.

Zenith also announced it has enhanced its **Z-181** portable computer with an 8-MHz clock speed, battery operation from four to seven hours and a hard disk drive interface. The Z-181 costs $2,399.

Zenith Data Systems, 1000 Milwaukee Ave., Glenview, Ill. 60025.

Software applications packages

Intex Solutions, Inc. has announced a Lotus Development Corp. 1-2-3 add-in said to provide users with the ability to create graphics from 1-2-3 data.

The software, called **3-D Graphics**, is said to transform 1-2-3 spreadsheet data directly into three-dimensional bars, joined bars, financial bars, lines and surface charts. Graphics features offered include automatic or manual selection of axis, addition of titles and axis labels and a choice between color or black and white. A range of Z-scale formats is also included.

3-D Graphics runs on IBM Personal Computers supporting Lotus 1-2-3 Version 2.0 or higher. It requires a Color Graphics Adapter, Enhanced Graphics Adapter or Hercules Computer Technology, Inc. card.

3-D Graphics costs $79.95.

Intex Solutions, 568 Washington St., Wellesley, Mass. 02181.

Software utilities

Armor Systems, Inc. has announced the **Bravo Import Data Bridge** for use with its IBM Personal Computer-based Bravo business system for retailers.

The Bravo Import Data Bridge is said to allow users to import any standard ASCII file containing virtually unlimited amounts of data. It features a fill-in-the-blank format so users can design their own templates to import only the desired data into either the Bravo Retail Management System or the Bravo General Accounting System files.

The Bravo Import Data Bridge is priced at $395. The Bravo Retail Management System and the Bravo General Accounting System cost $695 each.

Armor Systems, 324 N. Orlando Ave., Maitland, Fla. 32751.

Software enhancements

The Exim Toolkit Version 2.1, a collection of assembler and Basic routines designed to simplify programming done with Microsoft Corp.'s Quickbasic or IBM's Personal Computer Basic compilers, has been announced by **Exim Services of N.A., Inc.**

The routines include multiuser data and index-file management as well as screen, memory and window managers.

The Exim Toolkit Version 2.1 is priced at $65.

Exim Services of N.A., P.O. Box 5417, Clinton, N.J. 08809.

Training

A training program for learning Microsoft Corp.'s MS-DOS, said to translate 90 English commands into valid MS-DOS commands, has been announced by **Info Designs, Inc.**

DOS Step by Step is a computer-based tutorial that provides lessons in the MS-DOS file-naming conventions and syntax, MS-DOS for floppy-disk systems, MS-DOS for hard-disk systems and advanced DOS features including batch files.

Also included is a quick reference guide featuring 32 on-line commands.

DOS Step-by-Step is priced at $39.95.

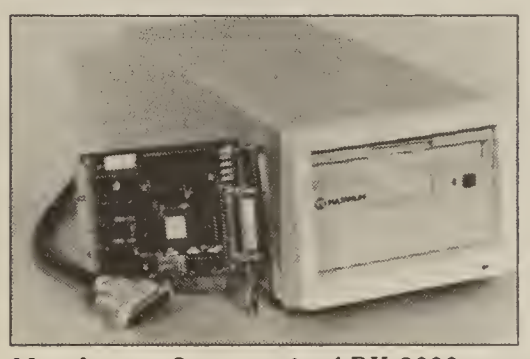
Info Designs, 445 Enterprise Court, Bloomfield Hills, Mich. 48013.

Data storage

Maximum Storage, Inc., has announced the **APX-3000** series of 5¼-in. optical drives and subsystems.

The APX-3000 product line was designed for IBM Personal Computers and compatibles in applications that require extended on-line storage capacity and removable media. It is available in host-mountable and external stand-alone configurations. Software compatibility is with IBM PC-DOS and Microsoft Corp. MS-DOS Versions 2.0 through 3.2. The 244M-byte drive comes with the vendor's Maxsys-PC system software.

Single-quantity pricing for the APX-3000 is $2,695. Media is priced at $75.



Maximum Storage's *APX-3000*

Maximum Storage, 5025 Centennial Blvd., Colorado Springs, Colo. 80919.

Printers/Plotters/ Peripherals

Fujitsu America, Inc. Computer Products Group has unveiled a family of 24-wire dot matrix printers.

The **DL3300** is an 80-col. printer, and the **DL3400** is a 136-col. printer. Both feature a Centronics Data Computer Corp. interface and printing speeds ranging from 288 char./sec. in high-speed draft mode to a letter-quality speed of 72 char./sec. Other features include a programmable front panel, a built-in bidirectional tractor and automatic sheet load. .

The DL3300 costs $795, and the DL3400 costs $995.

Fujitsu America, 3055 Orchard Drive, San Jose, Calif. 95134.

Board-level devices

STB Systems, Inc. has announced the **Dual Serial Adapter**, a single board said to combine two synchronous serial ports.

The adapter features two independent serial connectors intended to allow users to connect serial devices such as a modem, mouse or laser printer to an IBM Personal Computer, according to the vendor.

The Dual Serial Adapter is priced at $149.

STB, Suite 210, 1651 N. Glenville, Richardson, Texas 75081.

This dial modem comes with a feature you wouldn't expect for $445. Our reputation.

When you buy a dial modem for $445, most people don't expect to get much in the way of features. Least of all, a top notch reputation for quality.

But our 2230 Series of 2400 bps modems is made to the same exacting standards as other Codex modems. Modems that have earned such a reputation for quality, they are preferred by more experienced data communications managers than any other brand.

And rest assured, a reputation is hardly the only feature our dial modems come with. The 2230 Series also provides outstanding performance, reliability, and flexibility. They are all full duplex 2400 bps modems that operate synchronously or asynchronously with a unique auto dial feature that supports virtually any computer. Plus they're Hayes compatible and are available as standalone units or as dual modem cards that pack two modems on a single card for maximum space savings.

Of course it's impossible to tell you about every feature of our 2230 Series in this space. But a certain peace of mind comes with the knowledge that everything that goes into our dial modems has to measure up to what goes on them. Our name.

For information about 2400 bps modems starting at $445, call us at **1-800-426-1212 Ext. 234.** Or write Codex Corporation, Dept. 707-34, 7 Blue Hill River Rd., Canton, MA 02021-1097.

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DATA STREAM

Patricia Keefe

Microsoft out on a limb?

Analysts who spoke to *Computerworld* two weeks ago were pretty hard, and not without reason, on Microsoft Corp.'s OS/2 LAN Manager — possibly the most grandiose, if not vaporous, networking scheme to be revealed outside of IBM's Systems Application Architecture.

The OS/2 LAN Manager is championed by Microsoft and compatriot 3Com Corp. It was unveiled two weeks ago as the future open standard for personal computer network operating systems.

There are formidable obstacles standing in the way of the OS/2 LAN Manager. It is overly optimistic, to say the least, for Microsoft or 3Com to suggest that the product could become *the* microcomputer networking operating system without the obligatory nod from IBM. And chastizing outspoken analysts for saying so isn't going to change that.

Many observers say they expect IBM to address the same areas targeted by Microsoft's OS/2 LAN Manager with IBM-

Continued on page 46

IBM's Hancock fills in the gaps

Division president explains strategy of latest communication products

Several weeks ago, IBM made a flurry of communication product announcements that filled in some critical gaps in its unfolding distributed processing strategy, particularly in terms of network management and the integration of IBM's peer-to-peer networking scheme with the traditional Systems Network Architecture (SNA) hierarchy.

The president of IBM's Communication Products Division, Ellen Hancock, clarified and expanded on the significance of some of these key introductions during a recent interview with *Computerworld* Senior Editor Elisabeth Horwitt and West Coast correspondent James A. Martin.

Hancock has been with IBM for more than 20 years, having joined the company as a pro-

Ellen Hancock

grammer in its internal teleprocessing network group.

In general, what was IBM's strategy with the most recent communication product announcements?

What we did in the June 16 announcements was to enrich our 370 support by providing those protocols within our VTAM access method that will make it easier for IBM and our customers to have applications in the 370 host communicate with applications in a lot of different systems, whether they are [the] Series/1, System/36 or Personal Computer.

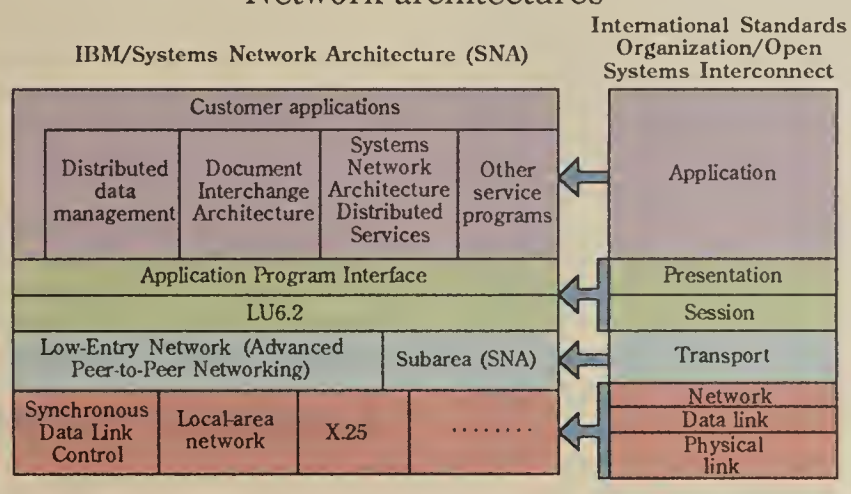
Across the product line, we've enhanced the ability to build a network and to do logical applications through LU6.2 and enhanced the PU2.1 low-entry networking.

Does IBM intend for Advanced Peer-to-Peer Networking (APPN) to be a prototype for the method

Continued on page 45

Data View

Network architectures



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Fox merger opens door

BY PATRICIA KEEFE
CW STAFF

DAYTON, Ohio — The pending merger of Digital Communications Associates, Inc. and Fox Research, Inc. could lead to an OEM contract between the former and Ing. C. Olivetti & Co. [CW, July 6], providing Digital Communications with an *entree* into overseas markets.

Continued on page 44

Users say suppliers dawdling

BY PATRICIA KEEFE
CW STAFF

CAMBRIDGE, Mass. — Computer equipment suppliers for major Fortune 1,000 firms, including IBM and Digital Equipment Corp., are not meeting users' personal computer connectivity needs, a recent survey of 100 of those firms found.

"For example, most users will tell you that IBM's VM Solutionpac is not true PC integration as people define it today," said John McCarthy, director of research at Forrester Research, Inc., based here.

Regarding DEC's VMS Services for Microsoft Corp.'s MS-DOS, users surveyed said the product is slow and very DEC VAX-oriented. "It took DEC nine months to deliver a card for IBM Personal Computers and compatibles to let them play in VMS Services. If you want to store DOS files on a VAX," McCarthy said, referring to MS- and IBM PC-DOS files, "you

Continued on page 44

Inside

BIT BLAST

Bell rings for ISDN; GM gets E-mail

Today, **Southwestern Bell Telephone Co.** is set to open a facility for testing Integrated Services Digital Network (ISDN) capabilities on different vendors' digital switches. Southwestern Bell's Advanced Technology Lab in St. Louis reportedly will test central-office switches from **AT&T, Northern Telecom, Inc., Ericsson, Inc.** and **Siemens Information Systems, Inc.**

Once tested, the features are to become part of the operating company's commercial offerings. So far, **Tenneco Oil Co., Shell Oil Co.** and AT&T have signed up for Southwestern Bell's commercial ISDN services, which should go on-line next year.

General Motors Corp. subsidiary **Electronic Data Systems Corp.** (EDS) said it plans to make **Western Union Telegraph Co.'s** Easylink electronic mail service available to 35,000 GM users.

The auto maker will use Easylink to exchange documents with other businesses within the U.S. and abroad via the service's telex interface. Access will reportedly be provided through EDS's Diamond Communications interface.

A Transmission Control Protocol/Internet Protocol (TCP/IP) controller for IBM 370-class mainframes reportedly is being jointly developed by **Advanced Computer Communications Co.** (ACC) and **Intel Corp.'s Systems Interconnect Operation.** The product is said to use Intel's Fastpath 9750 control unit and ACC's Access/MVS communications software to allow IBM hosts to communicate with other systems that support TCP/IP.

The V.32 9.6K bit/sec. dial-up modem market saw a price drop recently when **Gandalf Data, Inc.** introduced a full-duplex unit priced at $2,295. Earlier products were priced at approximately $3,500.

Available now, the Access Series V.32 supports either asynchronous or synchronous communications over either dial-up or leased lines.

Fox merger

FROM PAGE 43

At the very least, the merger could boost plans to introduce four more Fox products this year. Although Digital Communications said it has no plans to integrate Fox products with its own Irma line, both product families are compatible, and the two companies reportedly will work closely together on selected large corporate accounts.

Fox President Greg Goodall, who has worked closely with Olivetti for several years in the European markets, said Olivetti's initial reaction to the proposed merger was to characterize it as "a good move."

"There's a lot Fox can do to bring Digital Communications into the fold with Olivetti," Goodall said, adding that his company is very interested in the Olivetti-Fox relationship.

Meanwhile, Digital Communications reportedly will help Fox speed development of an IBM Micro Channel-compatible version of Fox's 10-Net adapter card. It is scheduled for release at Comdex/Fall '87.

Once Fox revamps the 10-Net cards, it will move on to four other projects, Goodall said. Fox's 10-Net is generally considered an entry-level network, and Goodall said his company plans to take advantage of that perception.

First, he said, Fox expects to offer 10-Net Version 4.0, an IBM Netbios-compatible version that is already in beta testing, in September. This release is expected to cost $695, support Microsoft Corp.'s MS-DOS 3.3 and be compatible with existing Fox boards. The vendor said Version 4.0 will also include software caching to enhance performance. The software-caching module reportedly will be unbundled for sale to users of 10-Net Version 3.1 who do not want Netbios compatibility but do want performance improvements.

Fox is said to be working on an intelligent 10-Net card that will feature an on-board processor and random-access memory and that will serve as the basis for two bridge products under development. The intelligent board will go into beta testing in July and will retail for $995, Goodall said.

Next, Fox will introduce an enhancement board designed to allow any existing 10-Net installation to bridge to a full Ethernet environment, such as an enterprisewide Ethernet backbone or Digital Equipment Corp. VAX environment, Goodall said. The Ethernet bridge reportedly will support thick and thin Ethernet and is slated for fourth-quarter delivery. Pricing is not yet available.

Fox said it plans to kick off the new year with a second bridge product, this one linking 10-Net to IBM Token-Ring environments. It is slated to ship in the first quarter of 1988, and pricing is not yet available.

The Digital Communications merger may serve to fuel Fox's limited interest in supporting Apple Computer, Inc.'s Appletalk network and Macintosh computers. Digital Communications introduced Irmalan for the Mac at Comdex/Spring '87. "We have not ourselves had the resources to work on a Mac product," Goodall said. "It's very difficult because of the Mac architecture. But we will be analyzing [that market] strategically with Digital Communications."

Dawdling

FROM PAGE 43

have to know VAX commands, which is absurd for users to know."

The grades that major computer manufacturers received as providers of personal computer integration products dropped an average of 7% in comparison with data from the same survey conducted a year ago by Forrester.

A multitude of reasons were cited as contributing to the drop in user satisfaction. "In some cases, vendors have been dragging their feet; in others, they are too minicomputer-oriented," McCarthy explained. "We used to be bullish on the departmental resources processor, for minis to reorient themselves away from the time-sharing business and service PCs. But these vendors have just dropped the ball."

Some vendors, such as Data General Corp., Prime Computer, Inc. and Wang Laboratories, Inc., have been late getting into the personal computer integration market. "They have only done so in the last two to three months," McCarthy recalled.

Delivery dates annoying

Users are also frustrated by availability dates. IBM's Personal System/2s are not scheduled to play on the company's 9370 until December, along with the 3270 Personal Computer emulation program, McCarthy said. In addition, the 3270-PC workstation program reportedly will not be available on the PS/2 until March 1988. "The PS/2 is supposed to be IBM's big machine; it's supposed to be optimized for connectivity," he said.

Users have become less patient with the major computer vendors, primarily because they have viable alternatives that provide relatively more direct and quick solutions today; for example, file and print sharing without having to learn minicomputer commands, McCarthy said.

The departmental computing and PC integration shortcomings of the minicomputer vendors are forcing users to recompile their lists of preferred suppliers.

The old guard — Wang, DG and Prime — is being replaced by Novell, Inc., 3Com Corp., Sun Microsystems, Inc. and other start-ups, the report said. "This has allowed [the younger companies] to take business from DEC, Hewlett-Packard Co., IBM [and others]," McCarthy said.

For example, Novell, working with a tiny value-added reseller, was able to beat out both IBM and DEC to win a million-dollar contract with Aetna Life & Casualty Co. in Hartford, Conn., last year.

LAN vendors enter scene

Meanwhile, local-area network (LAN) vendors are positioning themselves to move upmarket, providing links between their local clusters and IBM's Systems Network Architecture, IBM 3270-based hosts and remote locations.

"The rise of the LAN vendors, coupled with the arrival of IBM's 9370, will cause a shakeout among the minicomputer players," Forrester predicted.

The report is part of Forrester's "Professional Automation Report and Bulletin," which focuses on technology management within the Fortune 1,000.

IBM's Hancock

CONTINUED FROM PAGE 43

of allowing a variety of hosts to know where other nodes and resources are on a multinode peer-to-peer network?
First of all, some of the functionality of APPN — the ability to find out where things are, the ability to dynamically change the system — is a requirement across our product set, including the 370 or the System/36.

In the June 16 announcements, we did add functions to the VTAM network to allow it to add elements to the network just like the System/36 does. We also provided a way to merge [a VTAM-based network with an APPN-based System/36 network].

The System/36 can do its own networking and management using APPN but can also come into the SNA backbone network as managed by VTAM. So the customer can now pick whether he wants the System/36 to be in charge or the VTAM host.

Will IBM be offering any packaged applications for communication between the 9370 and the 370 systems?
As part of the Netview offering we're making, we're including some internally developed assistance using Netview — things that some of our own users have been doing.

We'll be including some sample Clists that have been used by our own operations staff to utilize the system. Those three things address the question of our own packaging for the system. There's a network definer we announced that simplifies a customer's ability to generate a system using VTAM and Netview.

What about a conversation between the two? One user we talked to said he is interested in making sure a token ring is up and running before he downloads important data from a 370 to a network.
The Netview Clist is a mechanism for the customer to add procedures to be used by Netview, so he can do a fair amount to determine the status of the 9370 before he wants to send it a work load. The customers are telling us they intend to make extensive use of the Clist capability in Netview and also the [new] capability of Netview on a 9370 to communicate with Netview on a [370] host.

Does the 9370 deal directly with IBM's LAN Manager? Is that how it collects network management data from the IBM Token-Ring?
The 9370 has an integrated Token-Ring LAN interface. It can collect error and usage information off that LAN and can determine who has a problem with a LAN; and Netview would then be aware of the LAN problem.

Will Netview capabilities be brought down as far as the Personal System/2 level?
We do have network management applications on the PC via Netview/PC. When you ask, "Will IBM port Netview specifically down to each [type of computer]?" I don't think the answer would be yes. If you ask, "Shouldn't the Netview *functions* be ported down to the System/36 and the PS/2?" The answer is yes.

We are enhancing the PS/2 and the System/36 with network management capabilities. We are driving our architecture across that range of products, and we will provide the customers with that network management capability across the product line, although some of the particular functions may change based on the types of things a 370 does vs. what a PS/2 does.

Some users have indicated that it would be nice if Netview were extended to whatever manages the bandwidth on a T1 link as a way of having more centralized control of a voice/data network. Do you agree?
One of the reasons we went with [an agreement to resell T1 switch equipment from] Network Equipment Technologies Corp. (NET) is that they do support the Netview/PC. The Netview/PC will communicate with Netview and give it information as to what is occurring on that particular T1 link.

We were also concerned about integration of T1 functions.

Most of these T1 multiplexers do networking among themselves with proprietary protocols. We have the right to incorporate NET's protocols into IBM equipment. That will help us ensure that the NET box really conforms to the SNA network and that the T1 resource manager supports the type of networking done by our SNA hosts, so that the MIS customer can have control of voice and data networking.

What is IBM's position on Integrated Services Digital Network (ISDN)?
We actively support ISDN as an international standard. We've volunteered into the standards committee's standard recommendations for network control and participated in tests in the UK and Belgium; and this summer, we'll have a test in West Germany.

We think it's important. We support it. But the true impact on our customers and, therefore, the timing of its acceptance, is going to depend on all those other factors. But we're not holding back. We are investing in ISDN.

Microsoft

CONTINUED FROM PAGE 43

developed products, including the proprietary Communications Manager component of IBM's OS/2 Extended Edition. So much, they say, for Microsoft's hope that IBM will incorporate LAN Manager into the OS/2 Extended Edition.

Also promoting skepticism is the project's proposed ship date — the first half of 1988. Talk about preannouncements. The OS/2 LAN Manager will undoubtedly go to the top of industry vaporware lists. And, as was noted two weeks ago, a lot can happen in nine months.

Of much less significance, and annoying to some, is Microsoft's unfortunate decision to use the name LAN Manager. It's confusing because IBM also has a different product called LAN Manager.

Nonetheless, MIS managers and network administrators should closely track the development of the OS/2 LAN Manager. Even if it doesn't set PC and PS/2 networking on its ear, the OS/2 LAN Manager is likely to garner a respectable market share. It could also set the stage for significant developments in network applications. At least that's what 3Com and Microsoft are betting on.

'New generation' of applications

Ingredients sure to attract MIS's attention to the proposed "platform for advanced computer networking" are backwards compatibility and the "new generation" of distributed applications.

Many Fortune 1,000 companies use a mix of IBM Personal Computers, compatibles and PS/2s. Multiple networks, most compatible with IBM's Netbios and some portion of Microsoft's MS-Net protocols, proliferate at the department level. The installed base is considerable, and the OS/2 LAN Manager is promising compatibility with most of the above, including networks based on Microsoft's Xenix Networks protocols.

Under the Microsoft/3Com scenario, future users could expect to link generations of microcomputers and their assorted operating systems, including Xenix, running on Ethernet, IBM Token-Ring and Apple Computer, Inc. Appletalk networks.

Having eased the worst fears of MIS and PC managers, the OS/2 LAN Manager is also projecting advances in an area in dire need of some help — network applications.

The problem with many popular PC applications is that they are available only for single-user environments. And those applications that have been ported to a networking, or multiuser, environment have generally proven less than satisfactory.

Enter OS/2 LAN Manager, a single-user, multitasking operating system. Microsoft says users will be able to take their single-user applications, load them into an OS/2 LAN Manager-based file server and distribute the applications across the network. It will no longer be necessary to port single-user programs over to the network, says Paul Maritz, general manager of Microsoft's networking business unit.

Also, by using an interprocessing communications scheme called Pipes (sound familiar, Unix fans?), two programs can be run at the same time, either with both at the workstation or with one at the server.

Of course, the OS/2 LAN Manager would not circumvent copy protection schemes, but developers who find it easier to port to OS/2 vs. the network may be more willing to provide server-based licensing. 3Com's relationship with a number of these companies could prove helpful.

3Com and Microsoft are also promising to develop applications "that make sense only on networks," such as distributed data base, directory and gateway services. Microsoft proposes to do away with the need for two user interfaces — one for the stand-alone workstation (DOS in its many forms) and a second for the network (Novell, Inc.'s Netware, 3Com's 3+, and so on). This would eliminate user resistance to having to purchase two separate programs and then learn two different sets of commands, Maritz says.

If the OS/2 LAN Manager lives up to its billing, it will probably be more than a little successful, even without IBM's blessing. But to truly make an impact, Microsoft and 3Com need to gain support among third-party applications developers. The fact is, many of these players have a vested interest in preserving Novell's lead in the network software market.

But don't count the OS/2 LAN Manager out just yet. Microsoft is the largest publisher of microcomputer software and wields considerable influence among third-party developers. 3Com recently embarked on a successful campaign to get developers of most of the popular network applications to develop 3+-compatible ports. These same developers are prime candidates to support OS/2 LAN Manager.

Microsoft and 3Com also have to face up publicly to questions concerning IBM connectivity, an area of critical concern to the Fortune 1,000. When this duo comes a courtin', MIS should demand they provide a blueprint for how their networking scheme fits in with IBM's. Insisting on support for IBM's Netview/PC and LU6.2 might be a good place to start.

Keefe is a *Computerworld* senior editor, networking.

NEW PRODUCTS

Local-area network hardware

Computer Pathways, Inc. has begun shipping its **Grapevine** high-performance work group local-area network (LAN) for small to medium-size businesses.

Offering users the ease of use of standalone software, the LAN links as many as 50 IBM Personal Computers or compatibles without requiring a dedicated file server, the vendor said.

With Grapevine, a user can exit an application and gain access to a pull-down menu with a single keystroke. Options for sending or receiving electronic mail or for changing printers are then available. Returning to the application is accomplished with a single keystroke.

Grapevine sells for $595 per station, not including wiring or cabling.

Computer Pathways, 19102 N. Creek Pkwy., Bothell, Wash. 98112.

Links

SST Data, Inc. has ported its **Handshake III** software to the IBM RT PC, allowing users of the RT PC to interface with an IBM System/34, 36 or 38 using 5251 terminal emulation.

According to the vendor, the terminal emulation allows the RT PC user to log on to the IBM system and function as an on-line terminal.

Handshake III offers file-passing capabilities as well as on-line Help and built-in security features.

Access is via either twinaxial cables or RS-232 connections. Operators may use either a standard 5251 keyboard layout or a customized keyboard layout. Users can also select an interface device with up to seven ports.

Handshake III 5251 costs from $1,930 to $4,735, depending on the number of ports.

SST, #201, 250 S. Main St., Thiensville, Wis. 53092.

Protocol converters

A multiprotocol, synchronous communications adapter for the IBM Personal System/2 series has been shipped by **Gateway Microsystems, Inc.**

The $295 **Microchannel Communications Controller** Adapter supports both binary synchronous communications and IBM's Systems Network Architecture/Synchronous Data Link Control protocols on one card. It was designed for the PS/2 Models 50, 60 and 80 and future models of the PS/2 that will incorporate IBM's Micro Channel architecture, Gateway said. The card allows PCs to access a host via either IBM's 3270 or RJE protocols.

Gateway Microsystems, Suite 105, 9501 Capital of Texas Highway, Austin, Texas 78759.

Modems/Multiplexers

Cermetek Microelectronics, Inc. has reduced the price of its CCITT V.32-compatible **9600/V.32 Trellis Modem.**

The modem permits 9.6K bit/sec. operation at full duplex over telephone lines in the Public Switched Telephone Network. It reportedly features trellis-coding near-end/far-end echo cancellation, adaptive equalization and automatic-to-manual fallback.

The 9600/V.32 Trellis Modem costs $2,495.

Cermetek Microelectronics, 1308 Borregas Ave., Sunnyvale, Calif. 94088.

Okidata Corp. has announced the external **Okitel 2400** and the internal **Okitel 2400b** 2.4K bit/sec. personal computer modems and the **Okitel 1200b** 300 and 1.2K bit/sec. internal modem.

The asynchronous, full-duplex modems feature autodial and autoanswer capabilities as well as automatic disconnection of the phone line when a call is complete. Users can program the modems with a delay that bypasses spurious line interruptions, including call-waiting signals, to maintain the phone connection.

The Okitel 2400 costs $599; the 2400b costs $549; and the 1200b costs $389.

Okidata, 532 Fellowship Road, Mount Laurel, N.J. 08054.

Diagnostic equipment

Dataprobe, Inc. has introduced the **Auto-Net** network-restoral system and the **K-56** A/B switch.

Auto-Net is said to be an automatic network-oriented dial backup system for up to 48 leased data circuits.

It detects degradation or failure of communication and automatically initiates dial backup. Auto-Net can also intiate a mode-substitution sequence, switching to spare modems at both ends of the circuit, the vendor said.

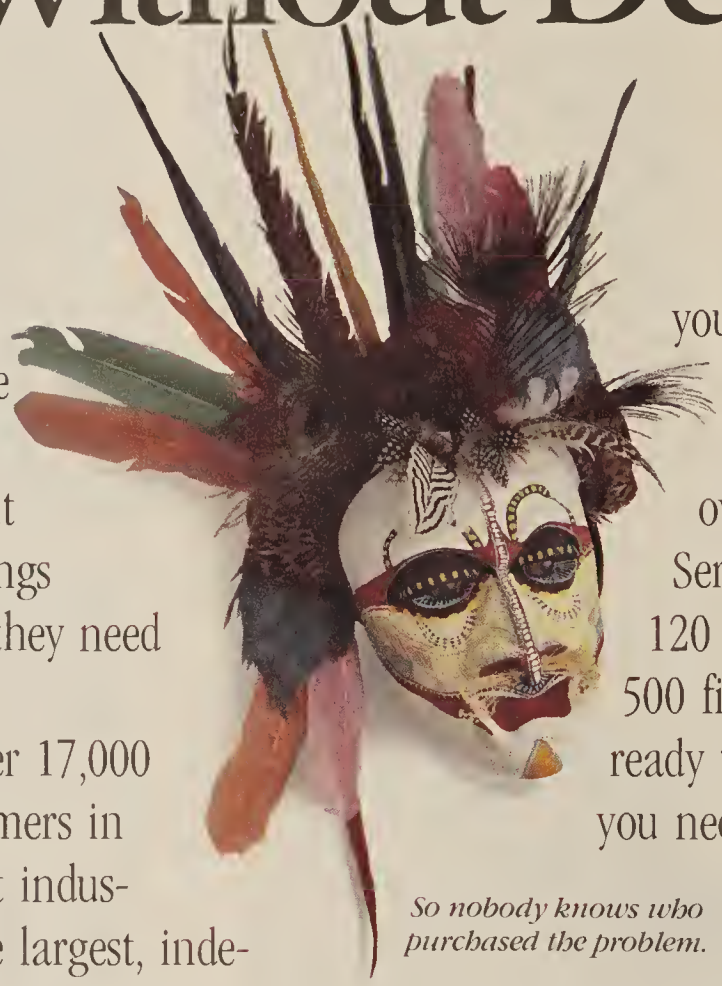
Aoto-Net reportedly switches the modems back to leased service when the leased line is restored.

The K-56 is a microprocessor-controlled switch designed to provide backup to 56K bit/sec. circuits. The K-56 units at each end of a circuit perform bidirectional security verification.

The Auto-Net costs $1,350 per circuit, and the K-56 costs $625.

Dataprobe, 110 W. Palisades Blvd., Palisades Park, N.J. 07650.

How to survive your S/3X without Decision Data.



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HARD TALK

James Connolly

They stoop to conquer

The scenario that has personal computers migrating into application areas served by more costly and complex systems has taken a bizarre twist.

It is easy to see how standalone and networked PCs based on Intel Corp. 80286 and 80386 microprocessors meet user needs previously addressed by 16-bit minicomputers and how those PCs can handle more work previously done on mainframes. But several vendors have been modifying that script by suggesting a new class of computer will squeeze the standard PC from above.

Those vendors are the makers of engineering workstations, such as Apollo Computer, Inc., Sun Microsystems, Inc. and Digital Equipment Corp., that hint that their high-powered CPUs and graphics display stations can replace PCs as the price gap narrows between the two types of systems. The vendors dropped the hints as they slashed their entry-level, diskless workstation prices to below $5,000, which pits those

Continued on page 50

Everybody into the coolant!

Fidelity Systems makes big splash by using pool to hold backup supply

BY STANLEY GIBSON
CW STAFF

LAS COLINAS, Texas — Michael Simmons, president of Fidelity Systems Co., has a real war story to tell. It is about the time fellow employees tossed him into the air-conditioning coolant of Fidelity's data center here.

No, it was not a cruel practical joke. And it was not just a nightmare — it really happened.

But Simmons took his dunking in stride. It took place at a party celebrating the opening of the swimming pool, which serves as the backup coolant supply for Fidelity Systems' data center. The computer center was opened here in March by the data processing subsidiary of Boston-based Fidelity Investments, Inc.

The data center houses two IBM 3090 Model 200 mainframes, an IBM 4381 and a Stratus Computer, Inc. XA 600 minicomputer. The water supply services 22 air conditioners that cool the firm's computing center. The 3090s do not draw on the water supply but have their own refrigeration units for cooling the water pumped through their thermal-conduction modules.

The center was designed to provide a fail-safe backup for Fidelity Systems' main data center in Boston. The Texas center has its own electrical generating facilities, consisting of three 1,200-horsepower diesel engines that can work together or separately, according to data center Director Gail Glass. If power is cut off, a battery supply that is continuously on-line would be drawn on immediately, providing a power bridge for what should be only 10 seconds until the diesel engines restart, Glass says. The 70,000-square-foot data center building reportedly cost $14 million.

Fidelity Systems' *Texas-style peripheral*

The unorthodox idea for coolant storage was arrived at logically enough, to hear Simmons recount it.

The mother of invention

"Necessity was the mother of invention," he says. "We wanted to build a data center that was fully redundant. But you can't make water fault-tolerant."

However, a water supply could be duplicated, Simmons reasoned. The primary water supply is kept in water towers on the roof of the two-story data center. At first, the plan called for a separate set of tanks in the ground nearby. But Simmons says when he realized that the supply would have to be filtered and chlorinated, the thought occurred to him: "Why not build a pool?"

Turning the backup water supply into a recreational pool changed what would have been a straight expense into a workplace quality-of-life improvement. Once committed to a pool,

Continued on page 51

MIPS adds high-end RISC units

SUNNYVALE, Calif. — MIPS Computer Systems, Inc. last week added a high-end Unix-based applications server and CPU board to its family of reduced instruction set computing products while cutting prices of existing offerings by up to 40%.

MIPS introduced the M/1000 system, which was designed to process up to 10 million instructions per second. The M/1000 is used as an applications server in high-performance Unix systems. It includes 16M bytes of memory, which can be expanded to 64M bytes, and a 12-slot VMEbus card cage. It costs $35,900 in single quantities.

MIPS also announced the R2800 CPU board, on which the M/1000 is based. The single-quantity price is $10,000.

The 40% price cuts affect the base configurations of MIPS's M/500 and M/800 systems and R2300 and R2600 CPU boards. The company claimed that 40 OEMs are designing systems based on its products.

Inside

Rexon shipping 32-, 64-user systems

VME-based Summit 4000 features 386 chip, 12-slot PC AT bus

BY STANLEY GIBSON
CW STAFF

CULVER CITY, Calif. — Rexon Business Machines Corp., a division of Rexon, Inc., is now shipping 32- and 64-user versions of its Summit 4000 multiuser system based on the Intel Corp. 80386 microprocessor. The system was announced last fall.

All Summit 4000 configurations include a VMEbus, a 12-slot IBM Personal Computer AT bus and card cage, a 600W power supply and an Intel 80286-based communication processor board.

Also included are five boards designed to plug into the VMEbus: the 16-MHz 80386 processor board, a dual-ported memory board including the interbus bridge processor, a system controller, a disk controller and a small computer systems interface controller.

The system can be customized with 1G byte of Winchester disk storage, 125M-byte cartridge-tape drives, VMEbus memory expansion boards in 2M- and 4M-byte increments and intelligent eight-port serial communication boards. The system can also accept off-the-shelf enhancement boards designed for the IBM PC AT.

Wyse Technology Model 60 terminals are sold separately with a suggested list price of $595 each. The terminals communicate with the processor at 19.2K bit/sec.

Through dealers and distributors, Rexon is offering preconfigured systems of the 32- and 64-user models. A 32-user system with 2M bytes of main memory, a 344M-byte disk drive, a 125M-byte ¼-in. cartridge tape drive and dual parallel ports is priced at $49,990.

The 64-user model with 4M bytes of main memory, 500M bytes of disk storage, the cartridge tape unit and two parallel ports is priced at $57,950.

Rexon said it intends to announce a 128-user system using dual 80386 chips by early 1988 but refused to name a price for this system.

Mentor bases design system on new Apollo workstations

BEAVERTON, Ore. — Mentor Graphics Corp. recently doubled the performance of its previous electronic design automation workstations with the introduction of systems based on the Apollo Computer, Inc. Domain Series 4000 workstation, which was introduced late last month.

Mentor Graphics said it has integrated its design automation products with Apollo 32-bit platforms.

The systems are available under the names Idea Station, which is for schematic capture and local simulation; Chip Station, for custom very large-scale integration circuit design and layout; and Board Station, for printed-circuit board design.

The company claimed that compute-intensive applications such as its Quicksim logic simulator run twice as fast on the Series 4000 as they do on earlier processors.

Graphics-intensive applications such as the company's Chipgraph circuit layout editor run more than 1½ times as fast on the Series 4000, according to Mentor Graphics.

Prices for the Series 4000-based systems start at $42,500. For example, an Idea Station with schematic capture, local simulation, documentation tools and a 170M-byte hard disk drive starts at about $54,000.

Dataserv doesn't see discounts in own future

Says it won't follow downward pricing trend, will focus on expanding current accounts

BY STANLEY GIBSON
CW STAFF

MINNEAPOLIS — Unlike IBM and other third-party maintenance rivals, Dataserv Computer Maintenance, Inc. will not be offering a discount program, according to President Phil Hinderaker.

"We do not intend to follow IBM on a downward spiral on pricing," Hinderaker said in a recent interview. He described IBM's Corporate Service Amendment (CSA) as an "aggressive price action," but asserted that Dataserv will not change its discounting structure in response.

Although Dataserv will not codify its prices, Hinderaker said that the price for maintenance quoted to a customer with network and problem management facilities would be less than the price quoted to one without such measures. Discounts are given to customers who have these measures under IBM's CSA program.

"Dataserv doesn't have a price book. We price according to what the user has," Hinderaker said. Dataserv prices are generally slightly less than IBM's with CSA discounts, but could be as much as 12% more than comparable IBM CSA prices, he said.

Targeting current accounts

Rather than cut prices, Dataserv will try to expand in its current accounts by stressing quality of service, Hinderaker said.

He said Dataserv's market is primarily those installations with $25,000 per month in maintenance expenses. "Fifty of our customers provide 92% of our revenue," he pointed out.

Don Goodspeed, president of Computer Maintenance Consultant, Ltd. in White Plains, N.Y., said Dataserv's approach could find a receptive audience. "Many businesses, such as banks, want high-level service and are not concerned with cutting the last nickel out of it."

Hinderaker said the point of CSA is to get users to buy more IBM computers, based on the premise that the person who controls maintenance controls the client's purchasing power. He said the CSA is intended to further this end by eliminating competition from the maintenance market.

Dataserv Computer Maintenance reported $39 million in sales last year. A subsidiary of Dataserv, Inc., it was launched in 1980.

Conquering

CONTINUED FROM PAGE 49

products against the upper half of the PC class — although it is obvious $5,000 buys a more fully configured PC than engineering workstation.

Major differences still exist between workstations and general-purpose PCs in terms of price and application. Workstations are cheaper than ever, but there are still relatively few micro users who need to jump to a Motorola, Inc. 68020-based workstation. But workstation vendors may not be too far off base when they toss out comments such as those Apollo officials did when they said they will place a workstation on every professional's desk, or as DEC executives promote their Vaxstation 2000 as a terminal on a larger VAX.

Workstations are expanding their market appeal beyond computer-aided design and engineering. The systems appear in areas such as finance houses and technical publishing and now run general-purpose IBM Personal Computer-compatible software. Analysts note that the workstations were designed from the beginning for communication with each other and with larger systems in a corporate environment, which is an advantage in comparisons with PCs.

True, Apollo and other 68020-based vendors have to prove they can make it in the PC business. Those vendors are at least a product generation away from enjoying the economies that make such a venture possible. They even deny they want to go into the general-purpose market, except when they can leverage their technical computing expertise.

But there also is something familiar in the hints about replacing PCs. The concept of placing a high-powered workstation on everyone's desk may be no more bizarre than the idea of replacing dumb terminals with intelligent PCs sounded five years ago. And PC makers are offering products that incorporate more and more of the features found in workstations. IBM's 80386-based Personal System/2 Model 80 has CPU power and a base price comparable with an Apollo, Sun or DEC workstation.

So while PCs continue their upward thrust, it is interesting to see another class of machines driving downward. What looms still more interesting is the collision that could take place in a year or so.

Connolly is *Computerworld's* senior editor, systems & peripherals.

Merged firm announces supermicro

BELMONT, Calif. — Fortune Systems/SCI Technology, Inc. recently announced a supermicrocomputer as one of the organization's first products since SCI Systems, Inc. agreed to acquire Fortune Systems Corp.'s hardware technology three months ago.

The Formula 4000 is intended for use by office work groups of two to 20 users and is based on the Motorola, Inc. 68020 microprocessor.

The Unix-based system reportedly runs applications written for Fortune's Formula 8000.

Entry level gets 40M-byte drive

The Formula 4000 is available in an entry-level configuration with a 40M-byte disk drive for $9,900.

A full configuration features a 145M-byte disk drive, 4M bytes of memory, a 60M-byte streaming tape drive and the Fortune Office Automation software. It costs $19,900.

The system, which will be distributed through the company's reseller network, was designed to compete with supermicrocomputers made by Altos Computer Systems and Convergent Technologies, Inc.

Coolant

CONTINUED FROM PAGE 49

Fidelity Systems also threw in a whirlpool, gazebo and locker rooms for employees.

Simmons claims the idea is original; Fidelity Systems did not get the idea for the swimming pool from any other computer center. He adds, however, that using such bodies of water as reflecting pools for emergency water supplies is not a new concept.

He says the dirt and debris that normally collect in pools can easily be filtered out before the water is fed into the center's cooling system.

In the hot, dry Texas summer, however, evaporation is a serious problem. Even though the rooftop tanks are covered, they can lose 45 gallons per minute in the heat of the summer.

Naturally, the pool water can evaporate as well, but it would take 72 hours for the pool to be emptied of its 76,000 gallons of water at the maximum evaporation rate, according to Simmons' calculations. In that worst-case scenario, Simmons says, a water tank truck could refill the pool daily.

An option Fidelity Systems considered but did not choose was to warm the pool during cold months with heat drawn from the computers. That step did not seem warranted by the expense involved, Simmons says.

In its short life, the pool's water supply has been tapped on four occasions, two of which were actual air-conditioning emergencies. However, in the course of a normal day, Glass says, it keeps 10 to 15 Fidelity Systems employees and their family members cool.

CDC integrates electronic, mechanical CAD

BY STANLEY GIBSON
CW STAFF

MIAMI BEACH — Control Data Corp. in Minneapolis recently announced the integration of electronic and mechanical computer-aided design (CAD) on a workstation with its Cyber 910 Model 300 system.

At the same time, CDC announced that the Electronic CAD suite of its Integrated Computer Engineering and Manufacturing (ICEM) software series can run on the Cyber 910 Model 300 workstations and Cyber 180 departmental and mainframe computers.

Previously, Electronic CAD had been available only for personal computers running Microsoft Corp.'s MS-DOS, according to the vendor.

Eliminates re-entering data

"ICEM now combines Electronic and Mechanical CAD in a truly integrated computing environment. Users benefit by not having to re-enter data when moving from electronic to mechanical design, or vice versa," said John Willey, manager of electronics marketing for CDC's computer-integrated manufacturing division, in a prepared statement.

The software was demonstrated at the Design Automation Conference, which was held here recently.

ICEM electronics software for Cyber 910 Model 300 workstations will be available after Sept. 1, CDC said.

Prices for the three major software products, ED-Schematics, ED-Layout and ED-Router, will be $10,000 each, CDC said. Prices for the PC versions of the software packages run from $4,000 to $6,000 each.

The Cyber 910 Model 300 workstation, introduced last year, features three-dimensional real-time graphics and a Unix operating system. Prices start at approximately $40,000.

NEW PRODUCTS

Turnkey systems

Honeywell, Inc. has introduced a compact version of its TDC 3000 control system designed specifically for small-plant and unit-level operations.

Called the **SPX Series**, the product is said to be made up of standard TDC 3000 components. Capabilities include batch or continuous control, prioritized alarm management, historical data collection and reporting and trending, demand logging, single-step display access and touch-screen display call-up, the vendor said.

One basic configuration includes an operator station with 19-in. color CRT, touch screen, keyboard, dual floppy disk drive and printer. A second configuration adds an additional workstation.

Prices begin at $70,000.

Honeywell, 16404 N. Black Canyon Highway, Phoenix, Ariz. 85023.

Processors

Two processor-accelerator products for AT&T 3B2 computer systems have been announced by **Congruent Technologies, Inc.**

The **CPU/500** is a replacement processor chip set utilizing 14-MHz components — CPU, Memory Management Unit and Clock Crystals. The **MAU/500** is a companion Math Accelerator Unit.

The CPU/500 costs $3,750. The MAU/500 costs $1,780.

Congruent Technologies, 9065 Jollyville Road, Austin, Texas 78759.

Data storage

Optotech, Inc. has reduced the price of its **write-once optical disks** designed to provide permanent transportable storage of data and images for users of Optotech's 5¼-in. optical disk drive.

The 400M-byte double-sided disks have been reduced in price from $225 to $125 each. The 200M-byte single-sided disks have been reduced from $125 to $65.

Optotech, 740-770 Wooten Road, Colorado Springs, Colo. 80915.

Terminals

Spectragraphics Corp. has enhanced its **Designset 1080** family of graphics workstations with a 19-in. color monitor featuring a high-contrast ratio and a neutral-density screen.

The DS 1080 workstations use a raster-scan graphics system that provides 1,024- by 1,024-pixel resolution in 256 colors with local three-dimensional transforms and area fill.

The DS 1080 workstation, including the 19-in. color monitor, is priced from $12,900.

Spectragraphics, 9125 Rehco Road, San Diego, Calif. 92121.

Printers/Plotters

The **Pinwriter Model P8300** 24-wire dot-matrix printer with printing speeds of 480 char./sec. in draft mode and 170 char./sec. in letter-quality mode has been announced by **NEC Information Systems, Inc.**

The P8300 offers built-in forms-handling capabilities including an integrated tractor, a tear bar and auto-load capacity. The vendor said mean time between failure is 7,000 hours.

The P8300 is priced at $2,795.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

Power supplies

Electronic Specialists, Inc. has expanded its line of **Unattended System Power Interrupters.**

Designed to protect unattended computer systems from power fluctuations or outages, the interrupters disconnect alternating current power when irregularities occur, according to the vendor.

The interrupters are priced from $210.

Electronic Specialists, 171 S. Main St., Natick, Mass. 01760.

PC EXPO®

5TH ANNIVERSARY PC EXPO IN NEW YORK

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Convention Center of New York
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CONNECTIVITY SOLUTIONS '87

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THE FIFTH PRODUCTION

Celebrating its fifth anniversary in New York, PC EXPO makes a great leap forward to an exhibitor base that is half again larger in 1987 than 1986. It is the largest computer show in New York. This has been accomplished without compromising the integrity of the show: only principal vendors presenting computer systems, hardware, software and services are included. There are not any exhibitors who are resellers. Consequently, corporate volume buyers and resellers are assured that PC EXPO remains the one marketplace that serves the computer trade with everything worth seeing and more of it.

This makes it possible for qualified people, like you, to talk to major suppliers, put your hands on their products, and get down to business on a volume buyer level. No undue crowds, no long wait to see the right person. No hassle. PC EXPO continues its policy of qualifying attendees as volume buyers who influence the purchase of product. Buyer convenience is maximized because the show is focused for you.

There is not even the smallest doubt that if you want to see everything in PCs, systems, peripherals, hardware and software — in one place at one time — PC EXPO is the one computer industry trade exposition you can't afford to miss.

WHO SHOULD ATTEND PC EXPO?

Volume buyers of PCs, systems, hardware, software and services are invited to attend the show and conference.

RESELLERS:

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As always, PC EXPO will present factory exhibits of microcomputers, minicomputers, networks, graphics, printers, computer related communications equipment, many hundreds of advanced software applications, maintenance service, and educational services, focused on manufacturing, accounting, financial operations, credit, education, R & D, retailing, design, engineering, education and government, among many other industries. You will be able to check out over 300 *new* or *improved* products and product lines at the 1987 show.

IT'S THE BEST SEMINAR SERIES IN THE BUSINESS. IT IS FREE. IT INCLUDES

CONNECTIVITY SOLUTIONS '87

If PC EXPO's 1986 conference program was as good as attendees told us it was, then we would have to invent some Hollywood-type words to describe what's coming up this September 1-3. Our 22-person advisory board has outlined three general categories that strike at the hearts of the major concerns volume buyers must address: Connectivity Solutions '87, PC management and technology. But it's the sub-category topics that are specifically on-target and meaningful. All the details start on the next page. Take time now to select the sessions that are of most interest to you, then register and mark your calendar for three worthwhile days at PC EXPO.

Please remember, if we receive your registration form by July 31, we will mail your badge to you in advance. You won't have to wait on any line, and you will save money, too, because on-site registration costs 25% more. And for your planning convenience, you will receive by mail a special preview edition of our show daily, "PC EXPO Today," that will update the show's events and list of exhibitors.

OF PC EXPO

A CADRE OF COOPERATIVE SPEAKERS AND PLANNERS

Over 200 speakers are ready to present PC EXPO's most ambitious conference program since the event was inaugurated. It's a fifth anniversary edition that brings together acutely aware end-users, consultants, and vendors. Their combined expertise will contribute synergistically to the store of PC knowledge under the direction of PC EXPO's 22-member board.

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SEMINARS *at a glance* *Featuring*

The most important challenge facing MIS professionals and executives in the face of today's new technologies and standards will be to organize and manage the various non-compatible elements of their large scale and very large scale installations into a fully integrated environment where mainframe, mini, PC, peripheral equipment and software systems are effectively "connected" and utilized.

Therefore, PC EXPO is planning to help its large volume corporate buyers and resellers meet the "connectivity" challenge. We invite you to participate in a new and exciting addition to PC EXPO in New York for 1987. As you choose your seminar sessions, take a close look at those highlighted with the special **Connectivity Solutions '87** Banner.

TUESDAY SEPTEMBER 1ST			WEDNESDAY	
12:00-1:20	1:30-2:50	3:00-4:30	10:30-11:50	12:00-1:20
Is the Information Center a Micro-Based Training Backwater?	CD ROM and Beyond: The Impact of Optical Memory on Personal Computers	Portables: Vest Pocket ATs Right Now	Getting the Message Across: Electronic Mail and Beyond CONNECTIVITY SOLUTIONS '87	Softline: Candid Comments from Industry Leaders
How to Buy a LAN — User Views CONNECTIVITY SOLUTIONS '87	Desktop Publishing Needs: Putting Your System Together	Network Strategies: Picking Network Configurations that Work CONNECTIVITY SOLUTIONS '87	Application Development Productivity Tools and CASE: A Primer	Resellers and End Users: Achieving the Delicate Balance
Micro-to-Minicomputer Links: Problems and Solutions CONNECTIVITY SOLUTIONS '87	AI on PCs: What, Where, When?	End User Support: Organization, Staffing Techniques and Concerns	Getting the Most Out of Your LAN CONNECTIVITY SOLUTIONS '87	Departmental Systems: When End User Computing Gets Out of Hand, What's an Information Center to do?
What Corporations Want From Software in 1988	DBMS: Is the LAN Mine a Gold Mine? CONNECTIVITY SOLUTIONS '87	Determining Data Residence in the Integrated Office CONNECTIVITY SOLUTIONS '87	Mass Storage Requirements of Emerging Computer Environments: Coping With Change	LAN Bridging CONNECTIVITY SOLUTIONS '87

Program subject to change without notice.
Cigarette smoking will be permitted in the exhibit hall.

CONNECTIVITY SOLUTIONS '87

PC EXPO Keynote Address

Bill Gates, chairman and CEO of Microsoft Corporation, will be speaking on the future direction of personal computers in the marketplace. Specifically, Mr. Gates will discuss his vision of how PCs will make their impact in several key areas within the industry, such as how PCs impact corporate buyers and how those corporate buyers will be able to leverage the many new technologies available today.

SEPTEMBER 2ND	
1:30-2:50	3:00-4:30
Desktop Publishing Applications: What Corporations are Doing?	Choosing a Local Area Network: Technical Solutions Through Case Histories CONNECTIVITY SOLUTIONS '87
80386: At Last, Answers Instead of Questions	Project Management Software: User Perspectives
Data Threats and Security in a Microcomputer Environment	Artificial Intelligence and the PC: The Practical, Commercial Viewpoint
End-User Computing: Making the Case to Management	Using Enhancement Products for Lotus 1-2-3

THURSDAY		SEPTEMBER 3RD	
10:30-11:50	12:00-1:20	1:30-2:50	3:00-4:30
Forging New Paths to the Mainframe CONNECTIVITY SOLUTIONS '87	Costs and Benefits of PCs	Software Support and Upgrades	Meeting the Challenge of Workgroup Computing CONNECTIVITY SOLUTIONS '87
Cutting Edge Legal Issues in the Technology Field	Current Issues in PC Training	Corporate Publishing: The Options from PC to Mainframe	Modern Clones and the Corporate Marketplace
Executive Information Systems: Do They Support Executives?	LANs and Multiuser Systems CONNECTIVITY SOLUTIONS '87	Computer Graphics for Effective Presentations	Getting the Most Out of Your Modem CONNECTIVITY SOLUTIONS '87
Gutenberg at the Desktop, 1990	Application Development Productivity Tools and CASE: A Roundtable Discussion	New Lives for Old: How to get Rid of your old computer when it's time for a new one	Keeping an Eye on the Optical Market

SEMINAR SERIES *in depth*

Tuesday, September 1, 12:00-1:20

Is the Information Center a Micro-Based Training Backwater?

Moderator: Shaku Atre, president, Atre International Consulting
Gerald Marrone, vice president, Citibank
Jim Valentine, vice president, Metropolitan Life Insurance

Now that 75 percent of the billion-dollar corporations have implemented information centers in one form or another, it is time to review IC goals and establish a direction for the mature information center. Unfortunately, the information center stereotype can relegate it to a limited, rather futureless function. Is that why some organizations have not implemented at all or have dismantled the established information center? This provocative session will challenge the belief that training is the only function of an information center, point out the dangers of that belief, and suggest directions appropriate for the strategic IC of the future.

Tuesday, September 1, 12:00-1:20

How to Buy a LAN — User Views

CONNECTIVITY SOLUTIONS '87

Moderator: Aaron Brenner, editor, *LAN Magazine*
Allan Karan, manager of office systems, Sperry & Hutchinson
Larry Stouder, Continental Grain
Dennis Eccleston, systems engineer, New York Power Authority

Buying a LAN gets easier every day. But there are still some things to know before you buy. First: what do you need and what type of LAN fits those needs? Next, you should evaluate different offerings, once you know the type of LAN you want. That includes things like benchmarks, test drives and RFPs. Finally, you have to know how to buy the LAN you want from the vendor you've chosen. Our panelists will leave you with at least 25 "things-to-know-when-you-buy-a-LAN."

Tuesday, September 1, 12:00-1:20

Micro-to-Minicomputer Links: Problems and Solutions

CONNECTIVITY SOLUTIONS '87

Moderator: George V. Kotelly, editor-in-chief, *Mini-Micro Systems*
Hugh Mackworth, workgroup communications manager, 3Com Corp.
Philip M. Lumish, senior vice president, CXI, Inc.
David Hunter, vice president, R & D, IDEAssociates, Inc.
Michael P. Krieger, senior product marketing manager, AST Research

As more and more personal computer users need access to the departmental mini-computer, systems equipment connectivity and integration become demanding corporate communications issues. Microcomputer-to-minicomputer links can satisfy these issues. But with the maze of methods and equipments available, managers must sift and sort through many options to obtain suitable solutions. This seminar will present the experiences and expertise of leading industry experts who will offer tried and true methods of addressing thorny micro-to-mini applications.

Tuesday, September 1, 12:00-1:20

What Corporations Want From Software in 1988

Moderator: Bill Lohse, publisher, *PC Magazine*

In 1988 there will be three business operating systems for PCs: MS DOS, MS OS/2, and OS/2. What software is being developed for which OSs? Which will be bought by which corporations? Why? Will OS/2E (IBM's OS with relational DB and Communications extensions) be introduced in 1988, and if so, how will that affect software developers and buyers? (Is the Applications Program Interface of 1988 Presentation Manager/Windows?) What of the character based programs (e.g. 1-2-3) in 1988? What useful impact beyond speed will the 386 have? What new problems will arise (e.g. networks, distributed data) and what kinds of software will be needed to solve them?

Tuesday, September 1, 1:30-2:50

CD ROM and Beyond: The Impact of Optical Memory on Personal Computers

Moderator: David Bunnell, chairman, PCW Communications, Inc.
Gary Kildall, founder, Digital Research, Inc.
Alan Boyd, president, Owl International
Stan Cornyn, president, The Record Group

The optical memory revolution is coming, but when and in what form? CD ROM, CD-1, and GD1 promise to bring new vitality to the personal computer. WORM technology is already here in the form of an IBM WORM drive. Will optical memory impact the high-end corporate PC market, or will it revitalize the home computer market? The possibilities are mind-boggling while the realities are sobering. Learn what the experts have to say.

Tuesday, September 1, 1:30-2:50

Desktop Publishing Needs: Putting Your System Together

Moderator: Rick DeCoyte, manager, Desktop Publishing Specialty Division, Management Information Software
Michael D'Agostino, vice president, Marketing and Sales, Princeton Graphic Systems
Richard Amen, president, DEST Corp.
Carolyn Grossman, product business manager, Desktop
Representative from IBM Corp.
J. Eisenberg, AM Varityper Corp.

The boom in desktop publishing has produced more questions than answers when it comes to setting up your PC systems. Do you need to upgrade your PC? Do you need a scanner or full page screen? Is higher processing speed necessary? Why do you need a laser printer? Do you need PostScript? This seminar will give you a clear view of all the elements necessary to start up your desktop publishing system, and answer many of the questions brought up by the desktop publishing phenomenon.

Tuesday, September 1, 1:30-2:50

AI on PCs: What, Where, When?

Moderator: Neal Goldsmith, Ph.D., research analyst, Gartner Group
Renee Barling, project director, Corporate Research and Development Group, Equitable Life Assurance
Chris Quinn, senior systems analyst, General Electric Credit Corp.

Until recently, large scale knowledge-based system development on a PC was inconceivable. Today, vendors and users alike are scrambling to keep up with new application, tool, language, and hardware developments. In this session, experts will shed light on what products are available today, where these technologies can be applied for competitive advantage in business, and when major new technological advances will likely be attained. A corporate panel representing both enthusiasts and skeptics will provide case experiences.

Tuesday, September 1, 1:30-2:50

DBMS: Is the LAN Mine a Gold Mine?

CONNECTIVITY SOLUTIONS 87

Moderator: Ed Bride, editor, *Software News*
Cheryl Currid, manager, Sales Systems Planning and Information, Coca-Cola Foods
Donna Staas, assistant vice president, manager of Office Systems Planning, FBS Information Services
Rick Segal, software specialist, Aetna Life and Casualty
Dan Spiner, CEO, Management Information Software

After all the talk about local area networks in the past decade, large users are finally reporting real-world applications, the most promising of which are based on database management systems. But, just as with any other evolving technology, implementing LAN-based applications is fraught with hazards. After an overview presentation by a corporate distributor of PC software, a panel of users discusses some of these hazards, and how they approached such areas as new applications development, file-sharing, data security, data dictionaries, the role of the mainframe, and the impact of mainframe processing. Time is allotted for audience interaction.

Tuesday, September 1, 3:00-4:30

Portables: Vest Pocket ATs Right Now

Moderator: Gene Talsky, president, Professional Marketing Management
Thomas O'Brien, president, Portable Computers
Anthony Ottavio, director of information systems, McKinsey & Company, Inc.

Advances in technology and manufacturing have enabled manufacturers to deliver full PC power and capabilities packaged in both battery-operated laptops and AC powered compact, light-weight "luggables." This session will cover the capabilities and limitations of these advanced portables and provide examples of how they are being used to fulfill application-specific business needs, as well as their growing use as general-purpose personal computers.

Tuesday, September 1, 3:00-4:30

Network Strategies: Picking Network Configurations that Work

CONNECTIVITY SOLUTIONS 87

Moderator: Mary Petrosky, west coast correspondent, *Network World*
Nathan Roseman, president, LAN Services, Inc.
John Good, manager of distributed systems, The Turner Corp.
Arthur Silverglate, PC coordinator, Bank of Montreal

How you configure a local area network depends largely on what you're trying to accomplish. Are you cabling a new building or looking to use installed wiring? Do you have a need for wide area communications? Do you want network services supported on a single server or spread across several servers? In this session, network consultants will discuss configuration considerations and general guidelines, and network users will share their successes and failures with different network topologies.

Tuesday, September 1, 3:00-4:30

Determining Data Residence in the Integrated Office

CONNECTIVITY SOLUTIONS 87

Moderator: Thomas White, president, The Seybold Group, Inc.

As workgroup computing becomes the standard of the late 80s and 90s, an important decision facing information processing professionals is how to determine where information will reside. Does the data stay with the corporate mainframe? Do we offload it to the nearest minicomputer or is it stored on the departmental processor? With the advent of more advanced data storage equipment that is affordable at the workgroup level, this decision becomes even more complex. This session will provide practical information on how to evaluate your requirements and develop a strategy that fits your organization. Specific information will also be given on currently available and future hardware and software technologies.

Tuesday, September 1, 3:00-4:30

End User Support: Organization, Staffing Techniques and Concerns

Moderator: R. Bruce Johnson, manager, PC Resource Center, Deloitte Haskins & Sells
Steven Sanazaro, systems analyst, American Bankers Association
Frances C. Lapinski, information systems manager, Depository Trust Co.
Robert R. West, president, Micro Support Resource Corp.

Supporting PC users is rapidly becoming a major management challenge. How many support people do you need? Are they part of MIS or a separate organization? Where do you get good support people? How do you measure the effectiveness of a support function? The support organization has to mesh with the structure, geography, politics and business objectives of the end user organization. The panel members are all involved in the day to day management of a support function. They represent a variety of industries and organizational structures. They will discuss what works for them and why.

Wednesday, September 2, 10:30-11:50

Getting the Message Across: Electronic Mail and Beyond

CONNECTIVITY SOLUTIONS 87

Moderator: Susanna Opper, telecommunications analyst and consultant
Sandi Fischer, quality assurance engineer, Eastman Kodak
R. Bruce Johnson, manager, PC Resource Center, Deloitte Haskins & Sells

The field of business communication is changing fast, and the personal computer is leading the revolution. Soon total connectivity won't mean just networked PCs and mainframes; it will also mean networked executives, managers, and staff. Now that you have the hardware in place, you can kill telephone tag, tie geographically dispersed work groups together and speed critical information to the right place in seconds. But there are hardware, software, and people decisions you'll need to make first. Using case studies from various corporate settings, panelists will reveal the do's and don'ts of electronic communication.

Wednesday, September 2, 10:30-11:50

Application Development Productivity Tools and CASE: A Primer

Speaker: Conny Wylie, president, Conny Wylie Corp.

The writing is on the wall for MIS/DP. The demand for information resources has become such a dominant concern in business today that application developers and management are constantly seeking new ways to improve system development productivity and quality. Thanks to the PC's new-found power, the likelihood is strong that applications will increasingly be developed on desktop workstations sporting a growing range of Computer Assisted Software Engineering workbenches and tool kits for specification, design, prototyping, version management, programming, testing, debugging, documentation and maintenance: the entire application development life cycle. CASE technology represents: complete architecture for addressing the application development productivity issue; an era where application development is done with "computer assistance"; and a breath of new life for backlogged MIS DP. Mr. Wylie's CASE primer includes the technologies it embraces, product categories and its productivity potential.

Wednesday, September 2, 10:30-11:50

Getting the Most Out of Your LAN

CONNECTIVITY SOLUTIONS 87

Moderator: Robert Clark, vice president, The Seybold Group Inc.
Harry Saal, president, Network General Corp.
Mark Calkins, director of marketing, Novell, Inc.
Linda Stewart, product marketing manager, Excelan
Peter Kraus, vice president, LAN Services, Inc.

In their simplest form, LANs can be thought of as a group of PCs interconnected by some type of cabling for the purpose of sharing hardware resources and information files. The degree of success which network PC users experience in sharing data and hardware resources is largely dependent upon the size of the network, the communication requirements of the users, and whether they have implemented network management procedures and tools to effectively control the resources of the network. This session will look at several of the more popular network management products and how users effectively manage their networks with these tools.

Wednesday, September 2, 10:30-11:50

Mass Storage Requirements of Emerging Computer Environments: Coping with Change

Moderator: Andrew Seybold, chairman of the board, The Seybold Group, Inc.

Wednesday, September 2, 12:00-1:20

Softline: Candid Comments from Industry Leaders

Moderator: Esther Dyson, editor, *Release 1.0*
Irene Greif, resident technician, Lotus Development Corp.
Gordon Eubanks, president, Symantec

Hear the leaders in the PC software business discuss the issues that concern them, and then ask them about the issues that concern you. This session will not feature product pitches, or prepared presentations, with a short Q & A. Rather, it will present 80 minutes of lively, interactive discussion among panelists and audience.

Wednesday, September 2, 12:00-1:20

Resellers and End Users: Achieving the Delicate Balance

Moderator: John Russell, executive editor, *Computer Reseller News*

With the average computer store generating 70 percent of its annual revenue through outside sales, a greater number of large and medium-sized corporations are regularly receiving sales solicitations from resellers. What do these end users expect from dealers in the areas of service and support? How do corporate buyers differentiate the attributes of computer-store-sales reps from manufacturers' direct-sales forces? In turn, what do resellers see as the key selling points needed to penetrate corporate markets? Is there any formula that guarantees success from both sides of the equation? This session will be composed of resellers and end users offering their views on these sensitive and provocative topics while attempting to find the common denominator that could help achieve a delicate balance.

Wednesday, September 2, 12:00-1:20

Departmental Systems: When End User Computing Gets Out of Hand, What's an Information Center to do?

Moderator: Theodore Klein, president, Boston Systems Group; director, Society for Management of Professional Computing
Barry Fischler, vice president, Bankers Trust Co.
George F. Colony, president, Forrester Research, Inc.

As end users grow more and more sophisticated, often with the help of training provided by the information center, there is a growing tendency for end user development of complex microcomputer software. These evolving systems often take on a much larger role in the support of departmental operations, although many times they are inefficiently designed, inadequately documented, and difficult to administer. This panel discussion will focus on recognizing and effectively dealing with the inevitable proliferation of PCs and the growing complexity of end user systems.

Wednesday, September 2, 12:00-1:20

LAN Bridging

CONNECTIVITY SOLUTIONS 87

Moderator: Roger Bender, assistant vice president, Citibank
Mark Westerhoff, micro manager, Electronic Data Systems
Leslie Fiering, manager, Advanced Technology, Bankers Trust Company
Katherine Merriam, Fell Computer

One of the promises of the LAN is the ability to integrate a variety of hardware and software systems into a single entity. Using a microcomputer's intelligence, the LAN has the potential to provide gateways and bridges between the IBM world, VAXs, Data General, Prime and other environments. What has actually been implemented? What is on the horizon? What is and will remain vapor for the forseeable future?

Wednesday, September 2, 1:30-2:50

Desktop Publishing Applications: What Corporations are Doing

Moderator: Susan Gubernat, editor, *Publish*
Rule Johnson Morris, director of office automation, SSC&B: Lintas Worldwide
Yoram Lirzman, assistant treasurer, Bankers Trust Company
Barry Katz, microcomputer manager, Price Waterhouse

Desktop publishing can truly be called a revolution only when users can testify to the significant impact this much-touted technology has had on their work lives. This panel of hands-on desktop publishers will explore the myths and realities of PC-based publishing. They'll discuss their own experiences with time and money savings, learning curves, changing job roles, and the issues of quality and compromise they've faced with this exciting new application.

Wednesday, September 2, 1:30-2:50

80386: At Last, Answers Instead of Questions

Moderator: Bill Machrone, editor, *PC Magazine*
Richard Bader, general manager, Intel PCEO
Michael Dell, chairman, PC's Limited
Richard M. Smith, president, Pharlap

IBM has finally dropped the other shoe, in the form of the PS/2 Model 80. It is a boon or bane? What is its effect on Compaq, the 386 add-on boards, and VM-86 control programs? Who's buying '386 machines and why? What is the real performance capability of the '386, especially against the Motorola-powered work-stations? Panel members represent both the hardware and software points of view, and their diverse backgrounds cover all aspects from the chip level through advanced application programs.

Wednesday, September 2, 1:30-2:50

Data Threats and Security in a Microcomputer Environment

Moderator: Dr. Harold Joseph Highland, editor-in-chief, *Computers & Security*
Bernard P. Zajac, Jr., database/data security manager, Abex Corp.
Stephen Hicks, president, United Software Security, Inc.
Belden Menkus, executive editor, *Journal of Systems Management*

Preventing security infractions in a microcomputer environment requires a comprehensive, multi-pronged approach. Following a demonstration of a systems attack by a computer virus and presentation of ways to protect the security of programs and data, several aspects of computer security will be presented by nationally known specialists. The problems addressed include: implementing a corporate microcomputer security program; an auditor's approach to microcomputer data security; and steps to take to protect evidence when a security breach has been discovered. A question-and-answer period is included.

Wednesday, September 2, 1:30-2:50

End-User Computing: Making the Case to Management

Moderator: Naomi Karten, president, Karten Associates
Kenneth Ross, president, Atrium Information Group
Raymond Glath, president, RG Software
Leslie Fiering, manager, Advanced Technology, Bankers Trust Company
Representative from Ford Environmental and Safety Engineering

User demands and expectations are increasing. But most micro support centers are understaffed, underbudgeted, and unable to adequately support user needs. It is likely that PCs will end up being unused, underused or — worse — misused. Many micro managers feel that the root of the problem is lack of management support of their efforts. But most micro managers are unsure of how to document and communicate the value of their services. What does management want to hear? What will help them understand the benefits of effective PC use and the risks of misuse? This panel will evaluate how to gain management appreciation of the successes of the micro support center and management support of its needs.

Wednesday, September 2, 3:00-4:30

Choosing a Local Area Network: Technical Solutions Through Case Histories

CONNECTIVITY SOLUTIONS '87

Moderator: Dan Spiner, CEO, Management Information Software
Bob Buchanan, product manager, 3+ Network Operating System Software, 3Com Corp.
Ray Noorda, president, Novell, Inc.
David Mahoney, president, Banyan Systems
Hank Kee, vice president, Chemical Bank
Representative from Merrill Lynch

Local area networks are becoming more important in the day-to-day operations of large corporations. The existence of different types of data and equipment necessitates hooking up systems which may or may not be compatible. Meanwhile, technological advances are changing the face of microcomputer connectivity in general. This panel will present the design and implementation solutions of local area networks, with emphasis on network architecture, cabling systems, network operating software and protocols available to solve connectivity problems.

Wednesday, September 2, 3:00-4:30

Project Management Software: User Perspectives

Moderator: Harvey A. Levine, principal, The Project Knowledge Group
Bill Haydock, manager, Information Systems Services, Peat Marwick, Main & Co.
Steven Manne, assistant vice president, New York City Transit Authority
Steven Crans, Boeing Computer Services
Diana Quinn, industrial engineer, Eastman Kodak

Project management software *users,* at several levels, from varied industries and backgrounds, talk about their satisfactions and frustrations with commercial, PC-based project management software. Panel members will discuss what they were looking for from their software and how well it did the job; comment on the preparations, training and changes required to implement a project management software system in order to maximize achievement of their objectives; evaluate the overall benefits gained from their implementations of project management software systems; and offer suggestions for vendors.

Wednesday, September 2, 3:00-4:30

Artificial Intelligence and the PC: The Practical, Commercial Viewpoint

Moderator: Dan DeSalvo, senior staff, MCI Telecommunications Corp.
Wendy Rausch-Hinden, president, Hi-Tech Editorial Inc.
Herb Edelstein, partner, Euclid Associates
Randy Manner, American Management Systems, Inc.

This panel of experts will present a realistic discussion of what can, and what should, be done with artificial intelligence software on PCs. The panel will discuss how to evaluate the technology, when and where to apply for it, and the process involved in planning and building practical AI applications on the PC.

Wednesday, September 2, 3:00-4:30

Using Enhancement Products for Lotus 1-2-3

Moderator: Rick Gibson, executive director, The Consortium Inc.
Michele Preston, vice president, Salomon Brothers
Dr. Thomas Byers, general manager, Turner Hall Publishing
Mitchell Russo, president, North Edge Software
Bob Raferty, marketing director, Tele-Ware West
Ned Prendergest, director, Companions Products Group, Lotus Development Corp.
Joseph A. King, Jr., vice president, Citicorp.

It is estimated that there are approximately 4-6 million users of Lotus 1-2-3. Many users are now using software add-ons that combine with Lotus to make them more productive in their work. These enhancements add capabilities such as: error-checking, spreadsheet saving, recovery, and learning, data crunching, enhanced graphics and scheduling, English documentation, time and billing, tax-planning, decision-support, instant macros, mainframe links, expanded memory, word-processing, vertical applications such as accounting, as well as dozens of excellent utility products. Panel members take a look at how to get the most out of a wide variety of enhancement products.

Thursday, September 3, 10:30-11:50

Forging New Paths to the Mainframe

CONNECTIVITY SOLUTIONS '87

Moderator: David Ushijima, technical editor, *MacWorld*
Robert Millstein, president, VM Personal Computing
Douglas Lifton, product manager, Digital Communications Associates
Charles Morel, chairman, CXI, Inc.
Isaac Kong, president, Network Software Associates, Inc.

The new generation of PCs, along with extensions to OS/2 from both IBM and third parties, will open new doors for communications between PCs and mainframes. This session will explore some of the ways in which new operating system developments will let PC users access and transfer information much more transparently than ever before. Panelists will offer current solutions to mainframe integration problems as well as analyze trends and improvements in the user interface.

Thursday, September 3, 10:30-11:50

Cutting Edge Legal Issues in the Technology Field

Moderator: John Yates, partner, Vaughan, Roach, Davis, Birch & Murphy
Kenneth A. Wasch, executive director, Software Publishers Association
Michael W. Mattox, senior council, Digital Communications Association
Robert H. Kohn, corporate council, Borland International

This presentation addresses recent legal developments affecting computer users and vendors. Panelists include leading legal and industry experts involved first-hand with major computer law issues. Among the topics to be addressed are the protection of software and "look and feel" issues, software piracy and corporate liability, shrink-wrap licensing, and tax and accounting considerations. The presentation will focus on practical pointers for users to reduce legal liability and for protection of legal rights in the computer area.

Thursday, September 3, 10:30-11:50

Executive Information Systems: Do They Support Executives?

Moderator: Naomi Karten, president, Karten Associates
David Friend, chairman, Pilot Executive Software
Robert Petrie, vice president, Manufacturer's Hanover Trust Co.
Robert Martin, manager, Executive Support Systems, Eaton Corp.

There's plenty of data out there. But executives don't want data. They want information, and they want it quickly and with push-of-a-button simplicity. Executives need systems which can track and display key corporate indicators, identify deviations from expectations, monitor performance over time, and summarize and aggregate data in various ways. Can executive information systems (EISs) that meet these needs be developed? What issues and factors come into play in identifying executive needs and developing an EIS? Panel members will discuss these and other issues revolving around the type and the reality of executive information systems.

Thursday, September 3, 10:30-11:50

Gutenberg at the Desktop, 1990

Speaker: Marshall Harmon, president, Harmon Kemp

Desktop or personal publishing has created a plethora of opportunities for PC users and managers. But beware of the poorly designed documents that will surely proliferate with everyone becoming a publisher. Newsletters, proposals and reports will be generated lacking the visual logic necessary to invite the audience to read or even consider reading the information printed on the page. This session will convey some fundamental principles of visual logic to assist the business person in avoiding bad design.

Thursday, September 3, 12:00-1:20

Costs and Benefits of PCs

Moderator: Dan DeSalvo, senior staff, MCI Telecommunications Corp.
Robert Farrar, budget & procurement officer, U.S. Senate Computer Center
Herb Edelstein, partner, Euclid Associates
James Naughton, president, Expert-Knowledge Systems, Inc.

This panel discussion will address the concerns of managers, administrators, and systems developers who need to evaluate the benefits and drawbacks of PC implementations. Expert panelists will speak from their broad experience in private industry and government, and topics will include methods for evaluating costs and benefits, justifying requirements, and streamlining PC administration.

Thursday, September 3, 12:00-1:20

Current Issues in PC Training

Moderator: Jane Stein, editor, *Data Training*
Chester Delaney, vice president, Systems Human Resource Division, Chase Manhattan Bank
Ralph Ganger, president, CES Training Corp.
Kenneth J.P. Burkhouse, computer training manager, Boeing Aerospace
Norm Ohren, president, Tectra Training

Just a few years ago the job seemed pretty straightforward: take a few hundred innocent new PC users, send them to class to learn a handful of DOS commands and the basics of a couple of standard software packages, and send them back to their offices to run spreadsheets and write reports to their hearts' content. Now, the varieties of hardware and software in the workplace have proliferated, LANs and links are looming on the horizon, some users are demanding advanced training while others are still coping with computer anxiety, and management wants to know when all that increased productivity is going to start showing up. Some people claim PC training is about to become obsolete while others insist we haven't even begun to address the real training needs. This panel will discuss these and other second-generation PC training questions such as the need for the systems training for PC users, the incorporation of real-world business problems, executive-level training, media selection, and the information center versus DP versus training department turf debate.

Thursday, September 3, 12:00-1:20

LANs and Multiuser Systems

CONNECTIVITY SOLUTIONS '87

Moderator: Steven Moore, features editor, *Network World*
John Carosella, consultant, Network Strategies, Inc.
William Heuser, director, Corporate Information Systems, Pneumo Abex
Ian Ebel, president, Microserv Technologies Corp.

Users and vendors square off in this session to argue key departmental networking questions raised by the new generation of Intel 80386-based personal computers. Should you buy a LAN composed of multitasking PCs, or a minicomputer that supports PCs instead of dumb terminals? Where do diskless PCs fit in? Will third-party vendors succeed in hanging dumb terminals onto multitasking PCs and selling them as multiuser systems? Finally, what new management issues are brought to the fore by today's proliferation of multiuser alternatives within corporate peer-to-peer networks?

Thursday, September 3, 12:00-1:20

Application Development Productivity Tools and CASE: A Roundtable Discussion

Moderator: Conny Wylie, president, Conny Wylie Corporation
John Ferro, PC coordinator, U.S. Congress
Paul Bassett, vice president of research, Netron Inc.
Stephen G. Perry, CEO, Mainframe Micros, Inc.

This panel will focus on the powerful set of applications development productivity tools and workbenches that make up a CASE development environment. This session dwells on real-world CASE experiences and implementations and reviews different perspectives on improving application development productivity with a CASE platform. CASE implementors will share their experiences and insights from actually installing and operating workbenches in their environments with examples of how these workbenches are being used, as well as dealing with the human issues that are coupled to CASE technology introduction. A notable consultant in this area, as well as a leading CASE vendor will be on hand to present experiences with CASE successes and failures.

Thursday, September 3, 1:30-2:50

Software Support and Upgrades

Moderator: Peter Hansen, vice president of marketing, Corporate Software Inc.

Software costs begin with the initial product purchase, but all too frequently the costs of training new users, responding to their phone calls, keeping up with version changes, and upgrading to new versions tax the resources of most Information Center managers. Until recently, software vendors have given little thought to the unique support needs of corporate customers. However, in the last year, most vendors have unveiled support programs for corporate customers that are tailored to their needs — at a price. This panel will discuss the changes that have occurred in the last year in software support and upgrade policies from the perspectives of both vendors and corporate information centers.

Thursday, September 3, 1:30-2:50

Corporate Publishing: The Options from PC to Mainframe

Moderator: Fritz Dressler, senior analyst, The Seybold Group Inc.
Stephanie Kott, microcomputer manager, Lord, Geller, Federico, Einstein, Inc.
Mark Skiba, president, American Programmer's Guild
David Boucher, president, Interleaf, Inc.
Bob Castellano, office systems manager, Reader's Digest

All companies are in two businesses, the one they think they're in and publishing. Publishing is part of every company. Here's a look at the spectrum of options all the way from individual PCs to PCs integrated within companywide systems. Emphasis is on the integration of the publishing function and company activities, and on the technical demands of companywide publishing. Presentations are based on case studies: "Here's what's available, and here's how and why it works." Topics include integrating graphics into word processors, creating business graphics, using small publishing teams and PCs, and publishing on a companywide basis.

Thursday, September 3, 1:30-2:50

Computer Graphics for Effective Presentations

Moderator: Douglas Barney, senior editor/microcomputing, *Computerworld*

Powerful personal computers are already ushering in a new age of presentation graphics — led by desktop publishing, high-resolution displays and three-dimensional graphics. This session looks at what state-of-the-art products are available on PCs now, and how buyers can navigate the confusing range of options to choose the software and hardware that are right for them.

Thursday, September 3, 1:30-2:50

New Lives for Old: How to get rid of your old computer when it's time for a new one

Speaker: Alex Randall, president, Boston Computer Exchange

What do you do when you're ready to upgrade your computer? You need a faster processor... a bigger hard disk... a better quality printer... a faster modem. The gear you have is perfectly OK, but you have outgrown it. This seminar will tell you how to "out-place" your computer equipment to make room for the new system you want. You'll learn what to do with the equipment to prepare it for sale, who can assist you, what problems to avoid, and how to protect yourself. Along the way, you'll learn about how to save money buying that new system, how to pick the best time to sell, and where to get accurate price information for used computer equipment.

Thursday, September 3, 3:00-4:30

Meeting the Challenge of Workgroup Computing

CONNECTIVITY SOLUTIONS '87

Moderator: Frank Derfler, connectivity editor, *PC Magazine*
Dr. Marv Schwartz, president, Chi Corp.
Jay Weil, director, product marketing, Excelan Corp.
Gregory Ennis, vice president, engineering, Univation

This session tackles the important technical issues of workgroup connectivity. Topics include improving workgroup productivity through networked utilities, workstation alternatives such as Lanstations and clustered CPU systems, and special emphasis on linking to corporate mainframes. Featured will be a close look at the use of NetBIOS in workgroup connectivity (both circuit switches and media sharing LANs) and plot industry trends and standards.

Thursday, September 3, 3:00-4:30

Modern Clones and the Corporate Marketplace

Moderator: Kevin Ferguson, managing editor, *Computer Reseller News*
Mark Litvinoff, director of PC support & technology, MONY Financial Services
Rhonda Lindenthal, assistant treasurer, Bankers Trust Co.

Has IBM really changed the rules with its new Personal System/2 line? How has it affected the clone market, particularly the low-end "clone-killer," the Model 30? Will there always be a true clone market, or will the Taiwanese, Korean, and Singaporean manufacturers now in their glory burn out very quickly? In addition to these topics, panelists will address, specifically, how corporate end-users are reacting. Some corporate users feel that they've been betrayed by the latest round of products and have seriously considered something they've never done before: buying non-IBM equipment to work with their installed bases of IBM equipment.

Thursday, September 3, 3:00-4:30

Getting the Most Out of Your Modem

CONNECTIVITY SOLUTIONS '87

Moderator: Jules H. Gilder, editor-in-chief, *Computers in Accounting*
Scott Walcheck, product marketing, Migent, Inc.
James Warner, product marketing modems, Digital Communications Associates
Dale Walsh, vice president engineering, U.S. Robotics
John McMullen, McMullen & McMullen
Representative from Ven-Tel, Inc.

As the use of personal computers in business increases, so does the need to transfer information between them. Modems are a crucial part in the computer-to-computer link. With a wide range of choices now available, selecting a modem is no longer easy. Do you need a modem that features high speed, small size or error correction? Will a "plain vanilla" modem do or are extra features necessary? How do you pick the modem that's right for you? And, once you've picked it, how do you use it effectively? These and other questions will be answered at the session.

Thursday, September 3, 3:00-4:30

Keeping an Eye on the Optical Market

Moderator: Harry Miller, editor, *PC World*
Michael Minor, vice president, Business Development, Microcomputer Specialists, Inc.
Mike Kaufman, director, Tallgrass Technologies Corp.
Jeffrey Dulude, director of marketing, Optotech, Inc.

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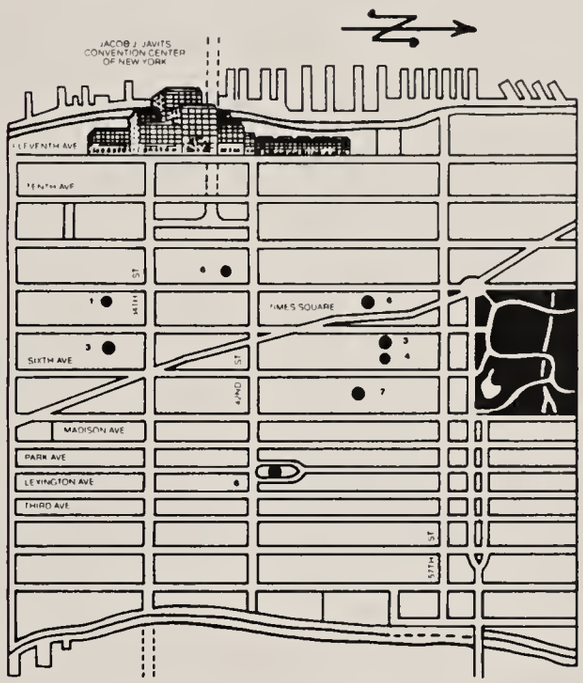

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Blueprint for a new shop: Space, cables, cooling, testing

STEVE LYONS

BY PHILIP J. GILL

Designing a data center is not a job for the weak of heart. If, as an MIS manager, you are about to supervise such a project, expect to function as more than a technologist and a manager — you will also have to take on the duties of construction engineer, architect, facilities planner, project manager, cost analyst and more. Most MIS managers will not have to play these roles more than a couple of times in their careers, but the roles will be among the most important and difficult jobs they ever undertake.

Norm Lansing's story is more atypical than typical. As the data center manager for TIE/Communications, Inc., a maker of digital private branch exchange and telephone key set equipment, Lansing has managed at least 20 construction projects, ranging from a simple remodeling to the top-to-bottom construction of a new data center in his 20-year career in DP. He even devised a plan — in 24 hours — to move an entire data center.

Lansing, who works at the company's Shelton, Conn., headquarters, says that in growing multinational firms, MIS professionals should expect at least one construction project — ranging from remodeling or refurbishing existing facilities to the construction of a completely new center or an entire building — at least once a year.

However, not all veteran MIS professionals have had to move their data centers so often, and not all choose to take such an active role. At the other extreme is Ron Brzezinski, vice-president of Quaker Oats Co., a Chicago-based food concern. He, too, is a 20-year DP professional. Brzezinski reports, however, that his spanking-new data center, part of the Quaker Oats headquarters in downtown Chicago, is only his second data center construction project. His advice: "Don't do it yourself." Consultants can often play a major role in large design projects.

A well-designed center starts with well-thought-out plans. Tom Rice, director of the computer hardware planning department at Com-Site International, Inc., a Beltsville, Md., data center design and construction firm, stresses the importance of an initial planning and feasibility study. During this study, in-house MIS professionals or an outside consultant can assess the needs and requirements for the data center, which "helps flesh out the design parameters," Rice says.

To help MIS focus its requirements, Tom Lalor, a partner at the St. John's Consulting Group,

Gill, former editor in chief of *Unix/World* magazine, is a free-lance writer with more than seven years of experience in the computer industry. He currently resides in San Mateo, Calif.

INSIDE

If your business grows, can your

Your data processing needs may be growing faster than your systems

HP 3000 family: Micro 3000 XE, Series 52, 58, 70, 930 and, not shown, Micro 3000 and Series 950.

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Business Computing Systems

Blueprint

FROM PAGE 53

a Westfield, N. J., data center design consultancy, strongly advises that managers begin by assembling a series of comprehensive lists. A data center design checklist should include a description of the work load going in and out of the computer room, cabling schematics, heating, cooling, water and security requirements.

In addition, Lalor says, managers should keep track of the following:

- All the local building codes, the Office of Safety and Health Administration safety codes and the like. Do not rely on architects, engineers or consultants who say they know, because in some cases they don't.
- All the applicable union rules, if union construction is involved.
- References of past customers, especially those of designers, architects and engineers. Ask particularly for references of jobs the firm did two to three years ago. "Computer rooms always look beautiful when they are brand new," Lalor comments. But, in truth, it's not until a few years down the road — when daily wear and tear begins to show the strain — that the quality of construction and flexibility of design begin to show as well.
- Make sure, if the office space is leased, that the lease terms protect MIS. Traditional leases often give the landlord 90 or even 180 days to determine what to do with office space after a fire. No company can be without its computer facilities for that long, and few firms can afford to use third-party "hot backup" services for that length of time. MIS needs the flexibility to find other space right away.

Also, make sure the landlord guarantees the structural integrity of the computer room for the life of the lease, provides 24-hour-a-day, seven-days-a-week access to the computer room and will not run pipes of any kind through the room.

- Ensure nothing computer-related is grounded to the structural steel of the building. It may be the simplest and cheapest way to go when building a data center, but it is also the most hazardous; frequent power interruptions can be expected.
- Make sure drains have check valves or indirect connections. This assures that water will not back up into the computer room.
- Go to each computer vendor for assistance and systems-assurance checks before you put out architectural, engineering and construction bids. Double-check with the vendor for computer-room requirements by showing the vendor the actual room specifications before it bids.

> A DATA CENTER design checklist should include a description of the work load going in and out of the computer room, cabling schematics, heating, cooling, water and security requirements.

Lalor says the more comprehensive and detailed these reports are, the better.

Moreover, the reports have an added benefit unrelated to the architectural or engineering concerns of building a new data center: Senior management, particularly those controlling the purse strings, will have a better idea of what's at stake and what's involved when building a new data center, how much it will really cost them and why. "If you can present them with all the facts," Lalor notes, "you'll have an easier job."

Size and space

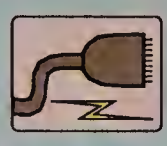
One important ingredient in the plan is the size and space requirements for your new data center. You know you're cramped today and a few more square feet are needed here and there to allow for the IBM 3090 on order or for better access to existing equipment. But what about two, three, five or even 10 years down the road? Do you know how many square feet you will need then?

Determining size and space requirements is probably the single most difficult task in designing a new data center. The only rule of thumb MIS professionals and consultants recommend is that a company first survey its existing needs and equipment and then forecast growth for the next few years.

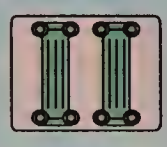
The length of the forecast depends on the company. Some suggest it should be closely allied with the company's own corporate business plan. Certainly, a historical look back at the growth of a company's computer usage will be helpful, but with computers, the past isn't always a good judge of what may happen

Continued on page 62

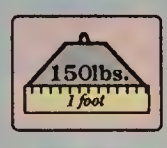
Typical computer center space requirements



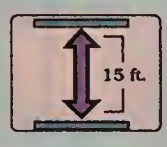
Maximum power cable lengths from the 415Hz power source to the mainframe computer: 148 ft



Most efficient column spacing for computer hardware configurations: 30 ft by 30 ft

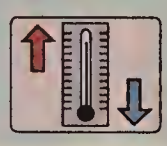


Computer center structural floor live load: 150 lbs per sq ft



Floor-to-floor distance: 15 ft

Electrical load: 50 to 70W per sq ft of raised floor to accommodate the ultimate computer load



Computer room space conditions: 70°F ± 2° and 50% relative humidity ± 5%

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No more cut and paste: Using software to design IBM shops

BY JEAN BOZMAN

For years, data processing professionals designing a data center or planning major change in the layout of their IBM computer room had to contend with stick-on plastic cutouts called templates.

The templates, offered by IBM, were intended to allow MIS managers to move around computers and peripherals on an engineering drawing. The problem was, the cutouts often fell off at inconvenient times. "You try to haul those templates to a room upstairs for a management review," one Los Angeles DP executive says, "and you hope it doesn't fall apart. You have to play cut-and-paste with those things."

In another corner of the city, Steven Graves had a better idea. A field service engineer with Quadtronix, Inc., Graves often thought about computerizing the process of planning IBM computer rooms.

In 1985, Graves began what would eventually become 4,000 hours of programming work to write Easimap — Equipment and System Installation Management and Planning. Available since September 1986, the $1,000 product is being sold by Graves's company, 21st Century Innovations, Inc. in Mission Viejo, Calif.

Stores IBM templates

Run in conjunction with Autodesk, Inc.'s Autocad software on an IBM Personal Computer, Easimap has stored within it the content and form of IBM's templates. It has been designed in such detail that users can elect to view drawings of the hardware systems, the underlying electrical connections or a three-dimensional color representation of the equipment.

Easimap is part of Autodesk's third-party applications support program and is priced at $2,850 for IBM PC AT-class machines.

"I wrote 20 layers of information for each IBM product," Graves says. "You can turn all the layers off if you want to. But when you are designing a computer facility, you leave the layers on to check if there is enough space between units or if the doors on one cabinet will hit another when opened." The electronic drawings are scaled ⅛ inch to the foot, rather than the ¼-inch scale used in the IBM templates, Graves says.

Details, details

Easimap, Graves claims, is a collection of thousands of details about IBM hardware. There are eight floppy disks in the program, all of which are needed to load data onto a hard disk of 2M bytes or more.

"Easimap is a three-dimensional symbol library that you use with Autocad to draw your computer room," Graves explains. The level of detail is so great, he says, that it took him a month to program the multitude of hardware specifications of the top-of-the-line IBM 3090 mainframe.

The minutiae include the essential information on the IBM equipment's power and cooling requirements. This means that when users complete their drawings, they can then call up a report on how much electrical capacity the current plan would require.

> "EASIMAP is a three-dimensional symbol library that you use with Autocad to draw your computer room."
>
> STEVEN GRAVES
> 21st CENTURY
> INNOVATIONS, INC.

Early users, among them oil companies, banks and airlines in the Los Angeles area, are pleased with their new-found ability to make design changes electronically before committing to plot out new drawings of the computer room.

"It's a more convenient way to lay out the computer room," says John Hershner, manager of facilities and administration at CCS Automation Systems, a subsidiary of Texas Air Corp. CCS, an independent airline reservations operation, is in the middle of a move to a renovated bank building and has been using Easimap since early spring.

"We are able to make additions and deletions easily," Hershner says, "and we are able to view different layouts to compare them."

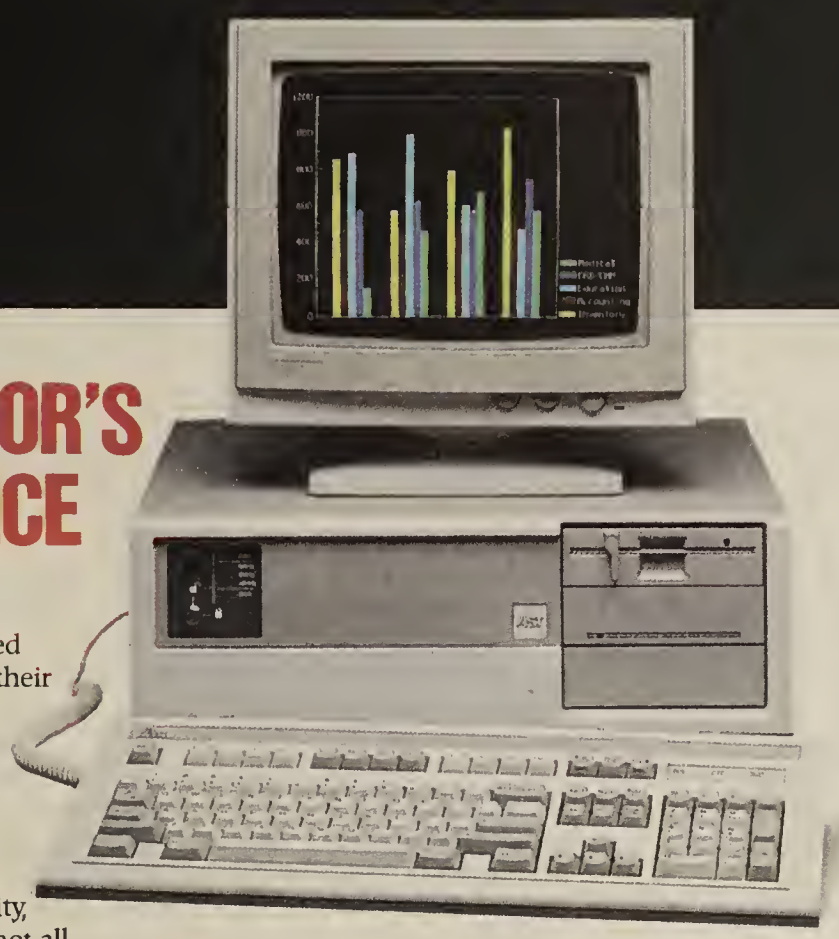
At Arco's Petroleum Products Division, Easimap has been in use for about a year. Senior technical analyst Mel Shutt says he feels the program will have a continuing use at the facility.

"In most data centers, nothing stays stagnant," he says. "It's costly to change things on detailed engineering drawings. Now we can view the computers themselves as well as the floor plan — and see everything down to the smoke detectors, the water pipes and the wiring." •

Bozman is *Computerworld*'s Chicago-based Midwest correspondent.

"The AST® Premium/286™ Rates As What May Be The Best Designed And Built AT® Compatible On The Market Today."

—PC Magazine, April 28, 1987



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You Guessed It.

What can go wrong? A checklist to help you anticipate construction problems

BY GEORGE HARRAR

A data center is the most difficult — and most expensive — building the average company will ever construct.

The general contractor, fresh from putting up a speculative office high-rise or condominium complex, just will not know the complexities of the computer environment well enough to construct a bug-free building.

So how can a supervising MIS manager avoid total catastrophe? The best way is to know what can go wrong and develop a system to test for all problems, large and small.

Chip Ralston designs data centers as managing principal for computer projects at The Kling-Lindquist Partnership, Inc., an engineering and design firm in Philadelphia.

Kling-Lindquist has built computing facilities for such organizations as Merrill Lynch & Co., Morgan Guaranty Bank, United Airlines and the International Monetary Fund, as well as a $200 million data center in New York City for Shearson Lehman Brothers, Inc.

Ralston says a simple, overlooked problem can delay the construction and opening of a finished building or perhaps go undetected until an emergency arises.

The following suggestions from Ralston and other Kling-Lindquist experts could be key to the successful construction of your data center:

> "A 100,000-sq-ft data center with a 50,000-sq-ft computer room would take about a year to design — that doesn't count any of the client's prethinking. . . . We would recommend the client run a fast-track project."
>
> CHIP RALSTON
> THE KLING-LINDQUIST PARTNERSHIP, INC.

Start to build before the design is completed.

Because of long lead times in ordering major equipment, it's possible for construction to begin before the design is actually completed.

"A 100,000-sq-ft data center with a 50,000-sq-ft computer room would take about a year to design — that doesn't count any of the client's prethinking before he comes to us. We would recommend the client run a fast-track project rather than waiting until our design is 100% complete," Ralston says.

Halfway into the data center's design phase, the architects and engineer will have developed enough documentation to start the excavation process and the foundation work, as well as order some of the long lead-time equipment, such as the uninterruptible power supply, switching gear and heavy electrical/mechanical equipment. These items can take eight to 10 months to arrive on-site.

Test equipment at the factory.

When ordering equipment, it is critical that engineering and fabrication tests are conducted at the factory. These tests can consume a month in the procurement cycle.

Ralston says that of equipment shipped to a site, "In one or two out of 10 major pieces, there are mistakes generated at the factory."

Mistakes caught on-site can delay construction; mistakes that go unnoticed may not be uncovered until after the building is occupied.

Ralston recalls that one company spent four months trying to pin down a problem. "In an office building," he says, "you can go for two years and live with hot spots; you can live with the chiller conked out. People will either move to a cooler spot or leave for the day while it gets fixed. When these computers go down, you can lose $2 million to $4 million in revenue in two or three hours."

Evaluate equipment safety devices.

Once vendors are chosen, evaluate their equipments' safety devices to ensure there is not something mechanical in an individual product that might shut down the entire system.

Ralston says this problem is common and points to Shearson Lehman as an example.

"When the generators came on, the chillers went off-line and came back on after two minutes. If you brought all of those chillers on at one time — they are 1,500-ton units — you would get such a surge of electricity that [it] would stall the generators. So we had to bring the chillers on, first one and then another — a soft start. We started the first one fine, we started the second one fine, but the third, fourth and fifth wouldn't start," he explains.

Ralston found in the air conditioner manufacturer's starting manual a mechanical safety device that allowed only a minute and a half for start-up.

Finally, the manufacturer had to be called in to redesign the safety.

Develop a stable operations team.

No architectural, structural, mechanical or electrical system should be put into the building without first developing a stable operational unit — the facilities staff — that can support the level of technology being installed.

At Shearson Lehman, the facilities staff practices emergency operations monthly. Such frequent emergency-mode training is all too unusual, according to Ralston.

Consider performance and energy requirements.

Because the computer center requires performance and energy capabilities five times greater than the rest of the building, place it near the primary utility center.

Set up separate electrical sources.

Rather than relying on a single electrical source, seek out two electrical services from two utility stations or from one station with separate busses. These services should enter the building at two different points.

Recognize wattage needs.

Average computer-room watt densities range from 30W to 60W per square foot, according to Ralston. However, the electrical load for any section of the room may reach three or four times the average watt density.

Individual cooling units must be able to be moved within the facility to where the load is concentrated. Otherwise, the cooling may end up at the wrong end of the floor.

Scrutinize Halon use in emergency detection systems.

Halon is heavier than air, so when it dumps, it comes out at 350 pounds per square inch, equivalent to a 200-mph wind, Ralston estimates. Such a force can blow out the ceiling tiles, so they need to be clipped in.

In addition, Halon will bleed through cracks, door openings and other holes unless the facility is perfectly sealed.

Ralston admits that using Halon in an actual emergency will rarely occur, but the use of Halon due to erroneous conditions — human error — can be expected at least once a year.

There should be a high degree of error-checking in the fire-detection system so that the first sensing of an event can be confirmed prior to any response by either the system or people.

A computer operator covering the facility on a Sunday night, for instance, should be able to respond to alarms by going to the indicated location of the emergency, lifting the floor tile and ascertaining whether there is a problem.

A Halon discharge caused by a real or imagined emergency could cost Shearson Lehman's data center more than $100,000.

Remember backup water supplies — they are often overlooked.

Determining the level of backup for water requires analyzing the municipal support system as well as intra-company resources and outside options.

"Shearson Lehman has used its backup water supply twice," Ralston says. "That's not uncommon."

Use heat byproducts.

Heat produced as a byproduct of cooling the computer room can be put to functional use.

"If a building has 10% of its space as computer environment," Ralston says, "you could heat the entire building from that computer space. Projections for Shearson say the building can be heated 98% of the time by their internal heat."

The byproduct is not high-grade heat, though, and won't effectively warm open areas such as loading docks or vestibules.

Consider filtration systems.

Special filtration setups can handle paper and ink dust and paper mites that accumulate in the ceilings in heavy printing environments.

Clean under the raised floor.

About every six months, the space under the floor should be professionally cleaned. Such cleaning is even more crucial after the building's construction — before activating detection systems. Dust, Ralston says, will cause false alarms for months after construction.

Brave the rigors of on-line testing.

On-line testing is a good gauge not only of a data center's systems integrity but of an MIS director's mettle.

As Ralston says, "With most of our clients, if we say, 'We want you to test your generator,' the facilities man will say, 'Oh no, Sunday morning I'll shut my computers down and you can test them.' Shearson will actually do it on-line. Very few clients will do that." •

Cost of a data center

Based on a typical site in northern New Jersey

Component	*Computer center only (cost per sq ft)*	*Data/Operations center (cost per sq ft)*
Structure	$21 to $24	$17 to $20
Architectural shell (floors, walls, roof)	$17 to $20	$17 to $20
Architectural fit-out (interior walls, doors, ceilings, lights)	$20 to $25	$18 to $25
Mechanical	$4 to $6	$3 to $5
Fire protection	$8 to $15	$4 to $6
Heating, ventilation, air-conditioning	$40 to $60[1]	$32 to $44
Electrical	$100 to $150	$56 to $80
Total facility	$210 to $300	$147 to $200[2]

[1] Estimate based on 50 to 60W per sq ft for computers on raised floor.
[2] Estimate based on computer center and utility space being 40% to 50% of total building area, with a total building area of between 50,000 and 200,000 sq ft.

INFORMATION PROVIDED BY THE KLING-LINDQUIST PARTNERSHIP, INC.
CW CHART: MITCHELL J. HAYES

Harrar is *Computerworld*'s features director.

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Blueprint

FROM PAGE 56

in the future.

TIE/Communications' Lansing says MIS should consult all the resources at hand to help determine size and space requirements for a new data center. "Then lick your finger and stick it up in the air," he advises. "It's still pretty much educated guesswork."

Square feet

In the computer industry, more is less when it comes to disk storage and processing capacity, but that hasn't necessarily translated into more in less square footage.

Lansing says miniaturization hasn't actually reduced the square footage needs for any data center project he's been involved with; all it has done, he says, "is allow us to put more in the same space."

Although it is unusual, downsizing the computer room is possible, and improvements or advances in technology can help.

Richard Kolm, director of MIS at New York's WNET, a

"A WET computer is better than no computer at all. You can always dry it out."

RICHARD KOLM
WNET

public broadcasting system television station, says that IBM's new disk-storage technology, which allows rack-mounted drives to be stored on top of each other, has enabled his new data center to be 30% smaller and, at the same time, provide more processing power and disk storage.

Kolm says WNET felt it had no choice but to downsize the computer room in order to keep the data center close to its user base.

Otherwise, the station's only alternative would have been to move the data center out of its expensive Manhattan facilities to New Jersey, where office space costs half or less of what it does in New York. However, the telecommunications costs between the data center and the user base that would be consuming those resources "would have eaten up the difference," Kolm maintains.

Don't get landlocked

Even with miniaturization and other technological advances, some companies are growing so rapidly that "better bang per square foot" won't hold back the computer room's walls for very long.

A key point to remember is to always build with the idea that you will eventually need to expand the data center. Make sure the surrounding areas are departments that are not as difficult or as costly to move as the data center. Often, these might be offices for systems programmers or similar employees.

Specifically, St. John's Lalor advises MIS to make sure that at least one data center wall can be expanded.

He says many firms, particularly those that are moving toward interactive or on-line transaction processing environments, have placed the corporate data entry function on one side of the data center.

The thinking is that the corporate data entry function is a dated area that "will go away by itself," thereby leaving a ready-made space for expansion that will cause little, if any, pain to corporate personnel and facilities and will minimize the costs of the data center's expansion as well.

Other facilities commonly placed alongside data centers today include conference rooms,

libraries and corporate archives.

The moral of the story is: Don't get landlocked, or else you may find yourself building another new data center much sooner than you expected.

Design requirements

Local building codes will, for the most part, determine structural requirements for the walls around the computer room as well as other areas. Most of these codes are based on the National Fire Protection Association's (NFPA) Standard Document 75, which outlines information on construction standards for rooms that will house computers and other DP equipment.

Most local building codes today comply with the NFPA's Standard Document 75, according to David Doyle, a senior architect for Digital Equipment Corp.'s Decsite Services. Decsite, headquartered at the firm's Westboro, Mass., facility, provides users with data center consulting, planning, design and construction services.

Doyle adds that many localities have begun using an updated version of the document adopted by the NFPA in 1986. Both versions call for a one-hour fire-rated wall around the computer room and a two-hour fire-rated wall around tape storage facilities.

You might find other design requirements will be driven by your company's insurers. For example, WNET's Kolm says his previous employer installed a Halon gas fire-protection system in a new data center — not because the building codes required it, but because the insurance company demanded it. Without the Halon system, insurance rates were sure to go up. With it, they went down.

Wiring needs

Wiring has become a two-pronged issue. First, large computers require a lot of cables, and that means a raised floor. Of course, raised floors also serve as an air plenum to keep cool air circulating around the computer.

St. John's Lalor, however, notes that raised floors were never originally designed into computer rooms for any of these reasons. Rather, raised floors were conceived so that buildings could support the additional weight of a computer and its peripherals, which often exceeded the building's pounds-per-square-foot specifications.

For whatever reason, raised floors are here to stay. In fact, more than one data center consultant and user say raised floors are going up, from the current norm of 12 inches to 18 or even 24 inches, in some cases.

Com-Site's Rice says many companies are raising the height of their floors because of the

"THE primary determining factor for DP center placement is the loading dock and freight elevator."

TOM RICE
COM-SITE INTERNATIONAL, INC.

larger channel cables and the increasing number of cables attached to many large mainframe computers today that require it. He also notes that many companies are elevating raised floors so that when the time comes to replace those cables, they will simply disconnect the old ones and lay the new ones on top.

The second issue in wiring is the impact of general office wiring on the data center design — that is, which local-area network (LAN) medium goes throughout an office building or facility.

TIE/Communications' Lansing says that how network devices interact with the main DP center, what kind of wiring they

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use, whether it is all digital or a mix and other factors about LANs will affect the design of the data center. And that, he adds, can be a problem, since so many companies are confused as to which way to go when wiring their buildings with LANs. "It's up to MIS to make that decision for them," he advises.

The following is a list of fire protection systems and the pros and cons of each.

Water and Halon gas. Users and consultants say the driving force behind wider use of automatic Halon gas systems is the insurance industry. Halon gas, however, should not be viewed as an end-all in fire protection. Sprinklers are still required. "You must protect human life as well," notes Sally Gonzalez, director of information systems at Hogan & Hartson. This law firm, one of Washington, D.C.'s largest, recently relocated its office. Gonzalez recommends Halon as the first line of defense, but insists that a computer room should also have an adequate sprinkler system as "a last resort."

WNET's Kolm points out that a wet computer is better than no computer at all. "You can always dry it out," he says.

Power and cooling. Once again, there is a complex web of decisions to be made, for not all of today's cooling systems are air-based. IBM's newest mainframe, the 3090, is water-cooled, so both air- and water-cooling systems may be required for your new data center, depending on the equipment used.

In general, though, MIS should survey other users in the locality where the new data center is to be built, talk to current customers in the local power grid about their experiences and even consult the local power company or public utility for available data. All of these resources have such information readily available, so use it.

MIS will also have to determine how to "clean" local power for glitches. Because a computer needs a constant flow of current or else it will crash, MIS has to add equipment to alter problems with power if it is not up to expected standards. In addition, you will have to determine whether your company will pay for a generator or full-scale uninterruptible power supply system to back up the computer in the event of a power failure. This will be determined by overall corporate business objectives, the need for continuous processing (how critical is it that the company's data processing resources stay up all the time?) and budget for data center construction.

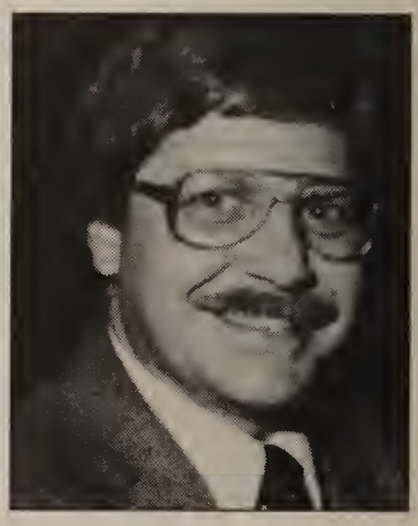
DP center placement

When placing a data center within a new facility, keep it away from the cafeteria, smoking areas and any other locations that might pose environmental hazards of any kind. Try to place the data center close to a freight elevator or, if possible, a loading dock, so that computers and supplies can easily be moved in and out.

In addition, keep data centers away from outside walls if at all possible, although this type of location may be unavoidable in high-rise office buildings.

The primary determining factor for DP center placement, according to Com-Site's Rice, is

Continued on page 71



"In growing multinational firms, MIS professionals should expect one construction project . . . at least once a year."

NORM LANSING
TIE/COMMUNICATIONS, INC.

Cable systems: Ties that bind

BY JAMES Y. BRYCE

The cable system you install will become the most permanent part of your new data center. Computers, software and people will come and go, but cables will always be with you.

The costs and disruptions of this kind of installation can represent a significant expense. In addition, larger cable systems require careful documentation and design. Add to these factors the expense of full-time administration and maintenance, and you will see the need for carefully planning these systems from the beginning.

The basic types of cable used in data communications are twisted pair, coaxial and fiber optic.

Twisted pair. The common twisted-pair telephone wire found within most existing buildings is difficult to characterize because of the variety and quality of twisted-pair installations. Therefore, its usefulness as a data-cabling option for a new data center design can be debated.

One reason is because this often old and discarded wire is unshielded, which means that it is susceptible to electromagnetic interference. In addition, the wire may go through a number of connecting points, or punch-down blocks, that can handle the low frequencies of telephones quite well but present a poor connection to high data-rate signals.

Because of variations in common twisted-pair wire quality, you might expect to pass data at 19.2K bit/sec. as a rule of thumb. This is not a fast transmission speed, considering that the advent of the microcomputer sounded the death knell of terminal-to-host communications. Every device tied to your cable is now expected to be a computer capable of pumping several hundred kilobits into the line — and several tens, and then hundreds, of megabits in the near future. If that line can only take 19.2K bit/sec., you will be in trouble.

Couple this with the fact that many of your cables must handle not one but a large number of machines in a bus or ring topology, then add all the data rates and probabilities of access of the machines together, and you arrive at an idea of the total capacity required of the cable system. This is the hundreds-of-megabits range.

High-quality twisted-pair cables, such as those specified for the IBM Cabling System, are also available. Data rates on the IBM Token-Ring network are currently 4M bit/sec. A move to 16M bit/sec. is expected soon. As long as the twisted pair is limited to runs to individual machines and the overall number of machines is limited, this cabling scheme should work for the short term.

What might give managers reason to hesitate in their decision concerning the use of high-quality twisted pair is the possibility of machines and fiber networks in the near future that could send ultrafast peer-to-peer data transmission.

Coaxial and fiber optics. Only two types of cable can carry signals in the hundreds-of-megabits-per-second range across sizable distances such as is required among the floors of a building or across a campus. These are coaxial and fiber-optic cable.

Coaxial may generally be relied on for 300M to 500M bit/sec. transmission. Fiber optics are often good for several thousand megabits. Since IBM has stated its intent to phase out coaxial in the near future, this leaves fiber optic and high-quality twisted pair as the choices for new data centers, with twisted pair being phased out within the next 10 years as knowledge about fiber optics increases and the costs of the associated electronics decrease.

But what about today?

First, plan for your future cable system to have a fiber-optic cable capable of transmission in excess of 100M bit/sec. as its backbone.

Second, become familiar with the IEEE standards for local-area networks (LAN): 802.3 (essentially Ethernet), 802.4 (token bus) and 802.5 (token ring).

If you work in an office environment, 802.3 or 802.5 should be your choice. By avoiding nonstandard systems, you avoid nonstandard cabling. Ethernet was originally designed to run on coaxial cable, and most Ethernet installations do use coaxial cable. However, several companies are offering products to run Ethernet on twisted-pair and fiber-optic cable, so you're safe if you choose the IBM Cabling System and use Ethernet.

If you choose the token ring, you will find it is made to work on the twisted-pair/fiber-optic environment, and you'll be off and running.

If you're involved with a factory environment, Manufacturing Automation Protocol, the standard established by General Motors Corp., and others, dictates using the token bus and the more complex, and expensive, broadband coaxial-cable system. There is a move under way, one especially promoted by Digital Equipment Corp., to use Ethernet in the factory, but the outcome of this option is seriously in doubt.

Currently, either the original or third-party manufacturer offers methods that will connect virtually any computing device to Ethernet. Soon, similar products will appear for the token ring. Since Ethernet can be implemented on either its original coaxial system, fiber optic, high-quality twisted pair or any combination of the three, selection of either the Ethernet coaxial system or IBM-type cabling system will offer maximum flexibility. (IBM-type equipment includes not only the products that follow the IBM specifications but also well-designed variations, such as those designed by AT&T and others that use less expensive equipment like modular plugs.)

Ultimately, you must plan for end-to-end connection with fiber-optic cables. Currently, multimode 62.5-micron cable appears to be the leading contender. If your budget allows, install a pair of such fibers in each workstation site; some vendors offer fiber optic and twisted pair within one cable sheath. Even though you do not place connectors at either end in the initial installation and run only the twisted pair, in the future you can install a connector on a cable with less cost and far less disruption than pulling additional cables.

Consider also putting one or two coaxial cables of the proper type for thin Ethernet and for broadband cable drops alongside your existing cable should you anticipate use of those systems in the near future.

In the long run, the goal is to avoid a situation in which it costs from $500 to $1,500 each time you install or move a workstation because of cable installation. The new LAN designs, either Ethernet or token ring, offer a simplicity and flexibility far beyond that of earlier terminal-to-host systems. They also offer the prospect of meeting future standards such as the ANSI Fiber Distributed Data Interface standard that will provide a 100M bit/sec. token ring. •

IN THE LONG RUN, the goal is to avoid a situation in which it costs from $500 to $1,500 each time you install or move a workstation because of cable installation.

Bryce lectures, conducts seminars and writes in the fields of computing, high technology and the effects of technology on society.

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Blueprint

CONTINUED FROM PAGE 66

the loading dock and freight elevator. His firm has worked on more than 1,200 high-technology building sites.

Hogan & Hartson's Gonzalez takes a different perspective. For her, the ideal location for a DP center is dead center — meaning at the center of north, south, east and west or even up and down, if the building is a multistoried corporate facility. In her case, she said she recommended the company do just that but was overruled by senior management. The company placed the data center in one corner of the east tower, a decision that cost the company $250,000 for extra wiring and limited its future technology choices: the firm wanted to install a point-to-point, twisted-pair, token-ring network to tie its general offices into the central data center, but now it can't run a ring through the entire office area as the company is in two separate towers.

Consider also the size of hallways and doors in the center's immediate area. "You don't want to be surprised by doors

McCormack & Co.'s Tim Casey

that aren't high enough or by corners that aren't wide enough for large equipment," TIE/Communications' Lansing says.

Consultants' input

According to Quaker Oats' Brzezinski, most MIS managers simply don't have the expertise to handle all the facets of designing and constructing a new corporate data center. He advises that MIS professionals seek a consultant's help early on, as well as the guidance of architects and engineers specializing in data center design and construction.

St. John's Lalor suggests that managers who hire consultants check not just the references of the consultants, but also the references of the architecture and engineering firms that they have hired to assist in the effort. Moreover, he recommends that the individual, personal references of those assigned to the project be checked as well.

Not all managers who have experienced a data center design recommend the use of outside experts. Some say that when you assign a project manager, it is preferable to have someone from the inside — an individual who knows how the company works and knows the personalities and politics involved.

If you choose an insider to handle the project, however, expect to have to relieve that individual of most, if not all, of his regular duties for the duration of the construction project. "Too many decisions have to be made on the spot," Gonzalez says. "You can't reassemble the original design team every time a decision has to be made."

> "THE IDEAL location for a DP center is dead center — meaning at the center of north, south, east and west or even up and down, if the building is a multistoried corporate facility."
>
> SALLY GONZALEZ
> HOGAN & HARTSON

As her center's project chief, Gonzalez says she gave up most of her day-to-day operational responsibilities as the firm's director of information systems and handed them over to a subordinate. "One person has to be designated project manager and relieved of most of the rest of their duties, and someone else has to be brought in or moved over to fill in."

Cost management

The best way to contain costs is to develop a good, comprehensive plan from the outset. Another way is to avoid rushed moves from one data center to the new one. Tim Casey, director of the computer utility at McCormack & Co. in Baltimore, says users can save a great deal of money if they can do a "design bid" rather than a "design build."

With a design bid, the user is able to go out ahead of time and get several bids on a proposed new data center. In this way, the MIS manager can play one construction firm against another and come up with the best price. This, however, requires the luxury of time.

A design build, on the other hand, occurs when the new data center has to be designed and built at practically the same time. "A design build is virtually always going to cost you more," Casey says. "It

Continued on page 74

Two burning issues: Fire control, air-conditioning

BY BECKY BATCHA

The last thing an MIS manager wants to think about when he draws up plans for his shiny new data center is the prospect of it burning down. And perhaps the last thing he is *inclined* to think about is the lowly air-conditioning system.

But neither fire suppression nor environmental control can escape notice for long. If an MIS manager tries to ignore the two issues, data center design firms, insurance underwriters, local fire marshalls and even data processing equipment vendors — through their strict warranty clauses — will hound him until he toes the line. These groups require data center owners to address both concerns early on and in great detail.

Fire-suppression systems. Most experts in data center design and construction agree that, since a fire can bring business operations to a halt, users should buy as much protection as they can possibly afford. In calculating that amount, MIS managers should ponder one vital question, says Ralph Smole, manager of technical research for Total Assets Protection, Inc. (TAP) in Arlington, Texas: "Should the data center go down . . . what is the impact on your business?"

The best fire-suppression scheme a company can buy is one with two lines of defense, according to Jerry Gallagher, senior vice-president in charge of engineering for Com-Site International, Inc. in Beltsville, Md. Gallagher recommends a total-flooding Halon 1301 system and a special type of water sprinkler known as a preaction, dry-pipe system.

• Halon gas. Halon vapor serves as the first line of defense. By interrupting the chemical process that causes objects to burn, Halon — a colorless, odorless, electrically nonconductive halogenated hydrocarbon — extinguishes electronic fires instantly. For DP environments, however, its biggest redeeming quality is that it puts out fires without harming electronic equipment. According to the National Fire Protection Association, computer equipment's power can be kept on straight through a Halon discharge.

Halon cleanup, moreover, is a breeze. To get rid of it, the MIS crew need only ventilate the room. Sites that are extremely sensitive to downtime find this feature especially attractive, Gallagher says. Some municipalities require special fans for Halon removal, but, for the most part, natural room ventilation alone will normally provide enough of an outlet for the gas.

Still, Halon alone cannot offer an absolute defense against fire. Once a Halon system discharges, its effectiveness ends. If the gas cannot extinguish a fire, or if the fire re-ignites after being extinguished, the data center has no protection left.

• Water. The second line of defense, a water-sprinkler system, comes into play at this point. Water is the single best agent for extinguishing fires, Gallagher says. A constant flood will squelch almost any fire before it can spread through a building.

Water will not permanently damage computer equipment or pose any threat of electrocution if the sprinkler system is rigged to shut off computer room power before any water can discharge. Preaction, dry-pipe sprinkler systems provide a double safeguard against water catastrophes. All pipes connected to a computer room's sprinkler system remain bone dry until two independent sensors trigger two separate release mechanisms.

Once water does enter the computer room, an MIS manager can count on a laborious and lengthy cleanup process. Most sites will need at least 24 hours to disassemble their soaked machines, wipe excess moisture and residue off each electronic component, blow-dry all components and put everything back together.

Raymond Dixson, president of Raymond Dixson & Associates, Inc., an engineering consultancy in Mission Viejo, Calif., says he knows of a large defense contractor whose sophisticated surveillance radar system was down for two weeks after an accidental sprinkler discharge.

Because most on-line sites cannot afford even an hour of downtime, the two-pronged system Gallagher recommends allows water to flow only as a last resort — and never by accident.

To gain the protection of a dual fire-suppression system, an MIS manager must agree to commit a lot of money. Halon systems alone cost approximately $10 per square foot of coverage, and preaction sprinkler systems cost an average of $4 per square foot, Gallagher says. Each manager must decide on his own whether $14 per square foot is acceptable or excessive.

If a site cannot afford to install two systems and must choose one instead of the other, an MIS manager will find himself bombarded by the prejudiced arguments of two camps. Because they are concerned with the protection of human life and building structures, local fire marshalls and insurance underwriters tend to

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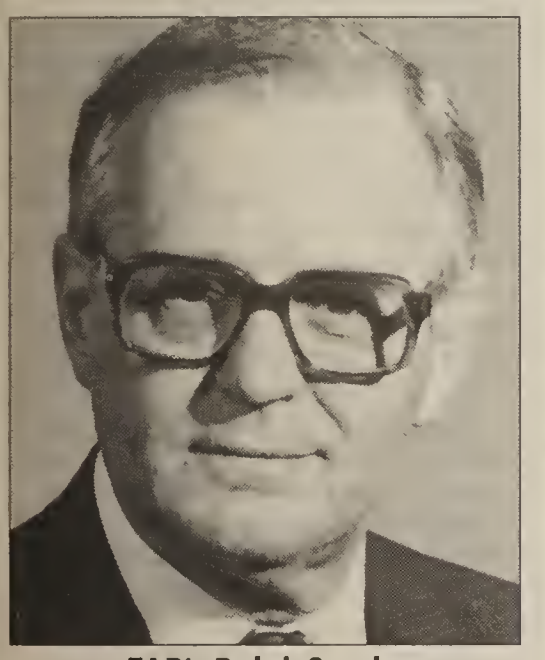
Batcha is a free-lance writer based in Boston.

prefer sprinkler systems. Specialists in data center design, on the other hand, worry more about damage to computers and loss of business operations and typically recommend Halon.

Absolute budget constraints and downtime considerations should serve as guides to which system makes more sense. Relative costs should also enter into the equation. For a national airline with 300 terminals on-line to its hosts, $50,000 for a Halon system is a meager investment for the peace of mind it offers, TAP's Smole says.

For companies that choose sprinkler systems instead of Halon, expense is not always the decisive factor. Thanks to the availability of dry-pipe setups and sophisticated monitors that allow for localized reactions to fire, sprinklers no longer threaten a site with a massive water dump. Given the low probability of a fire originating in a data center and the high likelihood that water will extinguish any fire that does start, these users feel sprinkler systems make more sense than Halon systems, regardless of price.

For many, choice never enters the picture. Insurance providers and fire regulations sometimes mandate that a site in-



TAP's Ralph Smole

stall sprinklers. If a manager can only afford one or the other, the local fire code alone can make up his mind for him. "Fire marshalls have a lot of power in this country," Com-Site's Gallagher says.

Air-conditioning systems. The conditions most likely to force a manager's hand in his choice of environmental-control systems are the vendor's warranty and the equipment's extreme vulnerability to even slight fluctuations in heat and humidity.

Every computer equipment manufacturer expects its machines to be maintained in a suitable environment, typically at a temperature of 70° to 75° Fahrenheit and a relative humidity of 50%, according to Tom Cusic, chief mechanical engineer at Com-Site. If a site lets the standards slip, vendors will invalidate the warranty.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., a leading source of information in this field, says air conditioners that can control conditions within plus or minus 1° Fahrenheit and plus or minus 5% relative humidity should keep most computer vendors happy.

Gauging the proper amount of air-conditioning for the computer room is a relatively straightforward operation. First, the user calculates the total amount of heat in BTUs that will be radiated by computers, disk drives, printers, people, wires, walls and even the air conditioners.

It is also helpful to calculate the anticipated growth in air-conditioning needs. Peter Fidelman, MIS director for ADT Corp. in Parsippany, N.J., suggests this approach: Look at corporate growth plans for the next three to five years and extrapolate the percentages to the data center. Increase the BTU equation by the proper amount. Add an additional 30% to 40%. "You will always grow faster than you thought," Fidelman says.

The next step is to convert the total number of BTUs into a number of "tons" — 12,000 BTU/hour — and match that figure with the tonnage of specific air-conditioning units.

To determine a unit's overall reliability, a careful MIS manager will look beyond the machine's mean time between failures. Users' reliability ratings should take into account vendors' repair and customer service organizations, Cusic says. Extra credit should go to a vendor that maintains a large repair depot in the city where the data center is located.

Although a quiet risk, air conditioner failure is one of the most likely disasters to befall a data center — about 200 times more likely than fire. Managers should keep two types of backup on hand:

- Redundant air conditioners. Extra units allow a site to keep operating if mechanical failure puts one machine out of commission. ADT's Fidelman keeps four units on hand but only needs three, making one redundant. The chance of two breaking at once is so slim, he says, that he feels sufficiently protected.
- Backup power supplies. Should the power in the computer room fail and the computer switch to standby power, the air-conditioning units will require backup as well. Dixson says that because modern DP shops require constant uptime, backup power for air-conditioning units is an absolute necessity.

In addition, he says, backup power must be sufficient to run every air conditioner, not just a select few. Because most computers and storage devices are networked and interactive, users cannot target just one machine as their central computing source, Dixson says. They need to run — and cool — all of them. "You don't know which one's got the goodies," he says. •

Blueprint

CONTINUED FROM PAGE 71

usually happens when someone says, 'You've got to move to a new data center in three months.' "

McCormack, a $1 billion spice and diversified products firm, is planning a move to a new corporate headquarters in about a year, which is plenty of time for a design bid, according to Casey.

This approach already has sliced $30,000 to $35,000 off the design cost of the new data center by allowing time for competition in design bidding, according to Casey, who says he expects even bigger savings when the construction bids go out.

WNET's Kolm points out that users can also significantly save money by digging out the vendors' environmental requirements for accuracy. He recounts waging a battle with IBM over the air-conditioning requirements for his System/38 minicomputer. He says that IBM's stated cooling requirements would have required him to install a second air-conditioning unit.

Upon inspection, however, he determined — and finally convinced IBM — that the firm's cooling specifications were based on servicing a model that was no longer offered and that his site did not use. That model had a disk-storage unit that generated excess heat, and without that unit, cooling requirements and costs were more than halved. •

St. John Consulting's Lalor

Protection: Water rules the waves

Conventional wisdom says that if an MIS manager can afford Halon fire protection, he should by all means buy it. But, if the fire-suppression systems chosen for two new data centers are any indication, conventional wisdom may be due for some renovation.

In ADT Corp.'s 4-month-old data center in Parsippany, N.J., and Putnam Companies' 7-month-old data center in Quincy, Mass., water sprinkler systems won out over Halon systems hands down..

Peter Fidelman, MIS director at ADT, says he wanted the most reliable protection he could buy. He knew water was a more effective agent than Halon for putting out fires, and he was not overly concerned with the possibility that a water dump might ruin his computer systems.

"The danger of fire destroying equipment is much, much greater than the danger of water destroying equipment," he says. Once the electricity in the computer room shuts down, about the worst thing water can do is wet the machines' components, and components are easily dried.

Moreover, the preaction, dry-pipe sprinkler system ADT installed in its data center features so many safeguards against a massive water dump, Fidelman says, that the likelihood of water ever coming in contact with the firm's computers is very small.

Shree Navkal, senior vice-president and MIS director at Putnam, echoes Fidelman's sentiments.

Through the use of sophisticated monitoring systems that can pinpoint a fire's location, Navkal says, Putnam's MIS staff can respond to localized fires before they spread. Portable Halon extinguishers can easily handle such fires, thereby rendering the firm's dry-pipe sprinkler system unnecessary.

In addition, Navkal says he has never heard of a fire that started inside a data center. With this in mind, he says, protecting the data center from fires that break out elsewhere is at least as important as guarding against computer room fires. Putnam surrounded its new data center with two-hour-rated walls, ceilings and floors.

Water sprinklers do not meet every fire-suppression need at ADT or Putnam. Both firms installed Halon systems in their tape-storage vaults, taking into account the special protection a company's data requires. Neither ADT nor Putnam felt it could afford a minute of inaccessibility to its data, according to Fidelman and Navkal, and a water dump could put tapes out of commission for hours until they dried. "You don't want anything to happen to your tapes," Fidelman says.

BECKY BATCHA

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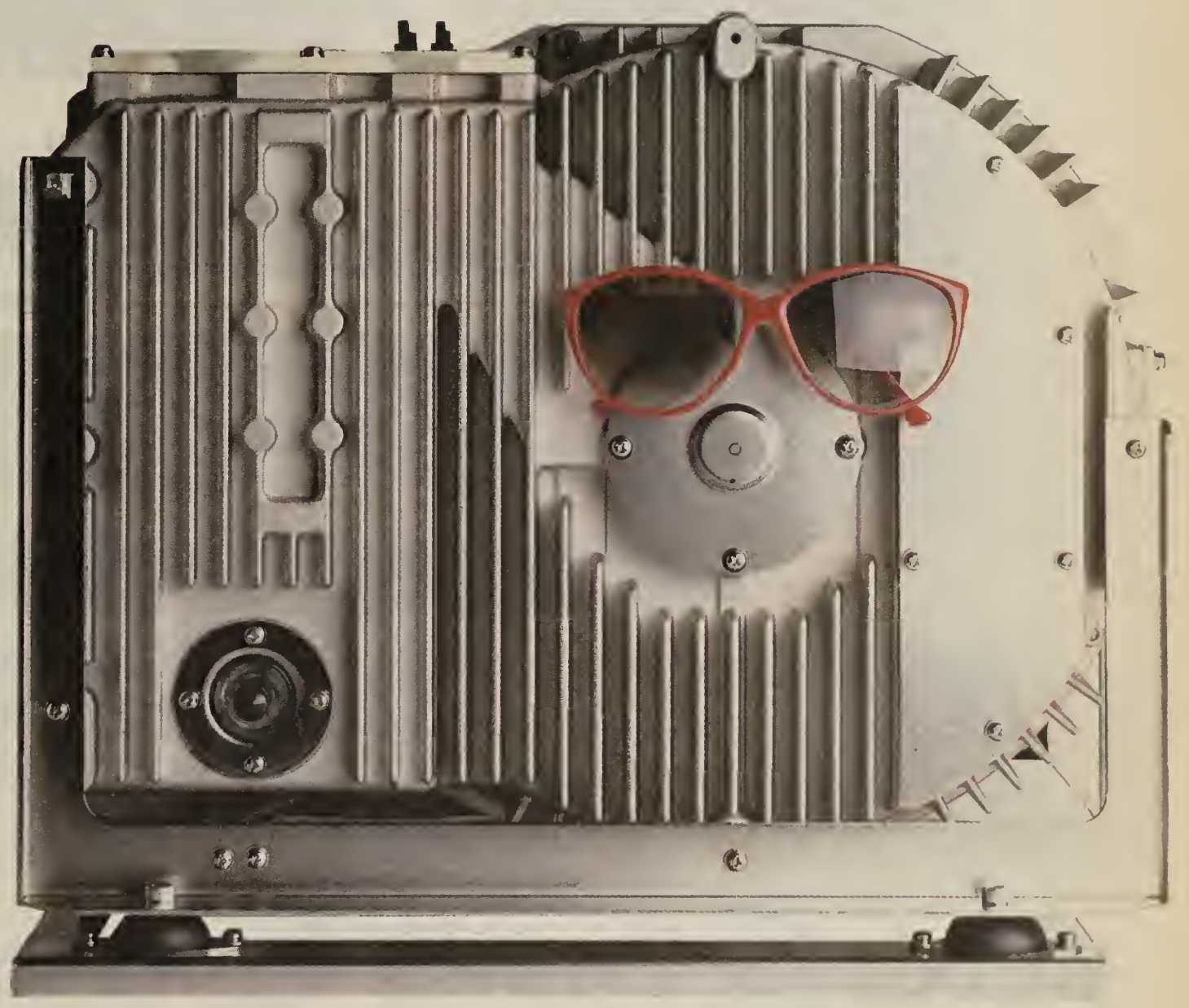

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Software maintenance: Thriving on respect

Image building boosts staff's creativity, keeps turnover low

BY WILMA OSBORNE

Software maintenance has long been viewed as unimportant, unchallenging, unrewarding, uncreative work that went unappreciated by users as well as the rest of the DP organization. In the past five years, however, this perception has changed noticeably.

Maintenance is now considered worthy of the efforts of experienced, well-qualified, dedicated professionals; it is no longer solely the responsibility of new or junior staff members. With the development of more multipurpose, complex software systems comes a recognized need for software maintenance programmers who can readily understand the entire system.

Maintenance is no longer a dirty word.

In 1982, the National Bureau of Standards (NBS) Institute for Computer Sciences and Technology (ICST) conducted two surveys of federal and industry software development and maintenance organizations. The first, a survey of eight government organizations and two industry firms, was performed by ICST staff members. The second, a survey of five government organizations and six industry firms, was performed by Science Applications International Corp. as part of an ICST contract effort.

Each of the surveys consisted of in-person interviews with managers and programmers. The surveys attempted to provide a representative sampling from the spectrum of software maintenance activities and associated problems.

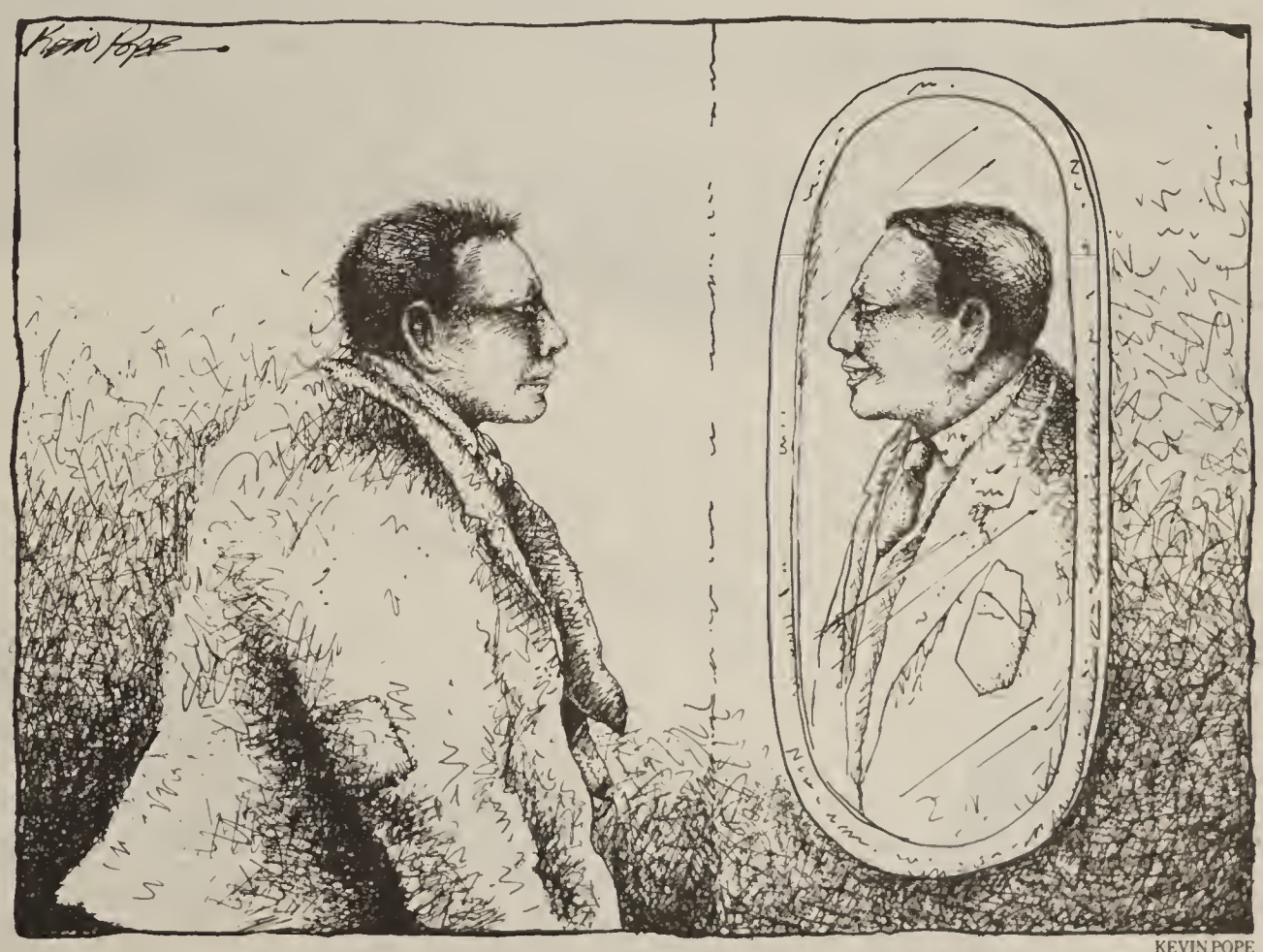
Recently, several of the participants were contacted again to determine whether maintenance issues and problems have changed significantly in the past five years; their comments are interspersed throughout.

Key to delivery

Traditionally, management rewarded software maintenance employees less generously than employees performing development. It was generally thought that systems analysts, designers and developers were responsible for the most difficult and challenging tasks and therefore must be more capable. While this attitude is still common, management is becoming increasingly aware of the importance of software maintenance to an organization's successful operation.

The maintenance programmer is the key to successful delivery of the product promised by management and desired by users. Indeed, maintenance programmers are the most important members of the application software staff. Often, they are responsible for large amounts of code, much of which was developed and previously maintained by someone else. This code is generally old, unstructured and often patched and inadequately documented. The potential for errors, delays and unhappy users is considerable.

Management has begun to acknowledge the importance of maintenance in terms of both the position's value and function. The consensus of the participants in the 1982 surveys as well as those reinterviewed recently was that software maintenance has gained more status in their organizations. Ephlyn Brooks, deputy director of Housing and Urban Development (HUD), notes that 55% to 65% of software costs for HUD this year went to maintenance, a percentage that has remained fairly



KEVIN POPE

Osborne is software maintenance project leader for the Software Engineering Group of the National Bureau of Standards Institute for Computer Sciences and Technology in Gaithersburg, Md.

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constant during the past few years. Most change requests are generated by users and can be categorized as adaptive changes or enhancements. She adds, however, that there have been improvements in maintenance quality.

Arnold Levin, chief of the systems software division at the U.S. Bureau of the Census, says that software maintenance at the bureau has improved as a result of placing "emphasis on simplicity rather than efficiency. The software changes must work well, and the code must be easy to understand." Levin adds that these two criteria are far more important than developing code that runs faster.

Perks and classes

In reaction to the changing status of maintenance, managers are taking action in the form of image building and management initiatives. DP managers are increasingly applying the same criteria to maintenance programmers that are applied to software and systems designers or other highly sought-after professional positions. If an individual is productive, consistently performs well, has a good attitude and displays initiative, it should not matter whether the project is development or maintenance.

> WHILE some organizations attempt to improve the morale and image of maintenance simply by renaming the maintenance function, this is a superficial approach.

Survey respondents indicated that their organizations are placing their more highly skilled personnel in maintenance positions. Some organizations now consider maintenance to be more demanding than development and require their maintenance programmers to have worked within development before assigning them to maintenance tasks.

While some organizations attempt to improve the morale and image of maintenance simply by renaming the maintenance function, this is a superficial approach. It does not alter maintenance programmmers' perception of the function or improve management support.

Other organizations are taking a more positive approach by acknowledging the importance and value of good maintenance with career opportunities, recognition and compensation. In the surveys, a number of managers indicate that praise and recognition are often as important as salary and challenging assignments in retaining good analysts and programmers.

Managers and programmers agree that work assignments need to offer growth potential. Continuing education is considered to be a requirement at all levels to ensure that not only maintenance employees but users, managers and operators thoroughly understand software maintenance. Training should include programming languages, standards and guidelines, operating systems and utilities.

According to the surveys, career paths for maintenance programmers are much more visible. Managers are now recognizing the correlation between the complexity of the maintenance task and that of development. Promotions are also now being based on performance, as are salaries; salaries at some agencies are as high as or higher than those of development staffs.

Jim Lowrie, director of application systems at the U.S. Bureau of Public Debt, says that within his agency more managers are now recognizing the importance of the software maintenance activity. In addition, turnover of maintenance programmers is no higher than that of any other professional staff. He attributes this to the fact that maintenance programmers and developers work on many of the same projects and are assigned the same types of tasks.

Lowrie points out that the effort currently devoted to software maintenance at his agency is substantially less than it was in 1983. He attributes this to a freeze on maintenance work resulting from the installation

of a new system.

What is heard more and more by DP managers discussing software maintenance is that the following points cannot be overemphasized:

- Maintenance is as important as development and is just as difficult and challenging.
- Maintenance programmers should be highly qualified, competent, dedicated professionals. The staff should include both senior and junior personnel. Do not shortchange maintenance, and do not isolate the maintenance staff.
- Maintenance should not be used as a training ground where junior staff members are left to sink or swim.
- Staff members should be rotated so they are assigned to both maintenance and development. It takes a good developer to be a good maintenance programmer and vice versa.
- Rotate assignments as well. Do not permit a system or a major part of a system to become someone's private domain.
- Good maintenance performance and good development performance should be rewarded equally.
- The staff should be well trained in order to keep performance at an optimum level and help minimize morale problems.

Staffing for maintenance

Selecting the proper staff for a software maintenance project is as important as the techniques and approaches employed. Managers debate as to whether an organization should keep separate staffs for maintenance and development. Many managers surveyed indicate separate staffs can improve the effectiveness of both functions. However, the realities of organization structure, staff ceilings and budget considerations often preclude it.

According to the surveys, one trend within the federal government is to use contract workers as maintenance programmers, with in-house personnel being used in nontechnical, management-oriented positions.

HUD's Brooks says that the DP staff at HUD has changed little in the last three years. Currently, the in-house staff consists of senior analysts and programmers who serve as contract monitors. Maintenance activities are performed primarily by contract personnel. Brooks notes that the amount of contract work is likely to increase as a result of federal "recompete procurement" directives. These directives require certain types of services to be opened for bid in the private sector; if a private vendor can provide such services at a competitive cost, the services must be procured from that vendor.

The Census Bureau's Levin says he believes software maintenance can best be performed in-house and should not be contracted out as a discrete function. His reasoning is that it takes too long to bring a contractor up to speed for the environment and the subtleties of the organization.

Listen to the user

Users are often unable to express exactly what they want from an application system. The initial requirements definition and design often lack the detailed specificity that would enable the developer to create a system that accurately performs all of the functions that users need. Thus, an incomplete system is placed into production. These problems can be significantly reduced if users are more involved in the software requirements definition and design.

Excessive, conflicting or vague user requests for changes and enhancements greatly affect the maintenance of an application system. Users are often unaware of how one change can affect both the system and the maintenance work load. The number of user change requests for a specific system is usually in direct proportion to the success of the original system and previous maintenance efforts. A thorough management review of change requests is essential to control the software maintenance level and ensure adequate feedback to users on the cost and consequences of each request.

Even if a system is well specified, well designed, well implemented and meets users' needs, users will always find something else to add. The old adage, "Nothing succeeds like success" holds true for software development and maintenance. If the system works well, users will constantly demand more features. If it does not work well, there will be an equally constant demand for remedial action to make it function properly.

Who drives software change?

Software maintenance is an important function that supports and contributes to the organization's ability to meet its goals. Although many software maintenance problems originate from the attitude that maintenance is there to fix what the software support staff can "never get right," this is no longer the prevalent view. The emphasis is now on the concept that software maintenance is essential to the organization's success and to its expanded capabilities to use existing systems. A number of forces drive the demand for software change. Users are almost never completely satisfied with a system: Either it does not perform up to expectations or, as they gain confidence in the system, they find additional features for the maintenance staff to add. This is a normal evolution in all software systems and must be considered when developing budget requests and resource allocation schedules.

Upper management drives the maintenance process by requesting enhanced features that must be incorporated into existing application systems. Once again, these requests are a normal part of any

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organization's functioning and must be planned for in the maintenance budget. Upper management, however, must be kept informed of the overall success of the software maintenance effort and the degree to which maintenance supports and enhances the organization's ability to meet its objectives. In dealing with upper management, one of the software maintenance manager's primary responsibilities is to see that maintenance is viewed in a positive perspective.

Finally, the maintenance staff drives the maintenance process. As a maintainance programmer works with a system, he often finds inefficiencies and potential problems. While not requiring immediate attention, these problems could, at some time, significantly affect either the functioning of the system or the ability to maintain it.

Thus, cleaning up code — often referred to as "preventive maintenance" — is an important aspect of the process that should be planned for and included in the resource allocation schedule. This undoubtedly will make future maintenance easier.

Knowing how and why a system works is essential to good maintenance. If requirements and design specifications are missing or incomplete, the maintainence programmer's task will be more difficult. Products will not perform as intended, which means users must request new changes and enhancements.

It is, therefore, essential that management establish and enforce controls to ensure that change requests are justified and do not interfere with the maintenance work load. One approach used in many of the organizations surveyed is to implement a software management policy.

According to the surveys, those environments that enforce a software management policy appear to have higher morale and more effective software maintenance. This is evidenced by survey responses from various levels within the organization, although it was expected that managers would see the picture differently from maintenance personnel.

The critical policy

Not surprisingly, both groups surveyed agree that the maintenance activity is critical to an organization's success and that more resources and support for the maintenance process are needed. The managers surveyed agree that standards need to be employed that describe the responsibilities, authorities, functions and operations of the software maintenance organization. Several managers indicate that software management policies should be comprehensive enough to address any type of change.

To be effective, the policy should be applied consistently and must be supported and promulgated by DP management to the extent that an organizational commitment to software maintenance is established. Without exception, each manager surveyed supports the use of software standards for both development and maintenance. When supported by upper management, such standards help direct attention toward the need for greater discipline in software design, development and maintenance.

The software management policy requires that the maintenance process offer, one, a documented need and justification for changes, two, designated responsibility for making the changes and, finally, use of modern programming practices, techniques and tools.

The policy should describe management's role and duties in software maintenance and define the procedures for controlling changes to the software after the baseline has been established. The policy helps to enforce adherence to rules regarding the software and documentation from initiation through completion of the requested change.

Once this is accomplished, it is possible to establish the milestones necessary to measure the effectiveness of the maintenance process.

Policies and plans are of little use if they are not followed. Most of the organizations surveyed periodically conduct

A model programmer

The characteristics of the ideal maintenance programmer include the following:

- **Flexibility.** Adapts to changing styles of coding, user requests and priorities.
- **Self-motivation.** Initiates complete work assignments independently.
- **Responsibility.** Performs tasks reliably in a dependable, timely manner.
- **Creativity.** Applies innovative ideas that result in practical solutions.
- **Discipline.** Performs consistently; not prone to trying haphazard approaches.
- **Analytic prowess.** Applies well-thought-out analyses.
- **Thoroughness.** Addresses small details so that all aspects of the problem are understood and tested.
- **Experience.** Demonstrates exposure to a variety of applications and programming environments.

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reviews and audits to ensure that software management policies and plans are being carried out; quality assurance testing currently is conducted on a regular basis.

Following are some standards for establishing a software maintenance policy.

Review and evaluate all requests for changes. All user and staff requests for changes to an application system (whether enhancements, preventive maintenance or errors) should be requested in writing and submitted to the software maintenance manager. Each change request should include a description of the requested change and a full justification for it. These change requests should be carefully reviewed and evaluated before any actual work is performed on the system.

ALTHOUGH it is the most important function of an application system software support activity, software maintenance receives far less attention when it is done well.

The evaluation should consider available staff resources vs. the estimated work load of the request; the estimated additional computing resources required for the design, testing, debugging and operation of the modified system; and the time and cost of updating the documentation. Of course, flexibility must be built into the process.

Plan for and schedule maintenance. The review of all change requests should generate a priority assignment for each request and an updated schedule for meeting those requests. In many DP organizations, there are simply more work requests than staff resources to meet them. Therefore, all work should be scheduled and every effort made to adhere to the schedule rather than constantly changing course in response to the most visible crisis.

Restrict code changes to the approved work. In many cases, there is a strong temptation to change other sections of the code as long as the program is undergoing revision. The software maintenance manager must monitor the work of the software maintenance staff and ensure that only authorized work is performed.

To monitor maintenance effectively, the maintenance manager must monitor all activities — from the change request form to the final revised source program listing. Permitting software maintenance staff to make changes other than those authorized can cause schedules to slip and may prevent other work with higher priority from being completed on time. It is difficult to limit the work done on a specific program, but doing so is imperative to the overall success of the maintenance function.

Enforce documentation and coding standards. Some programmers do not like to document and others are not good at it, but documentation suffers primarily because of too much pressure and too little time. Complete communication of critical information between all personnel involved with the system is essential.

The most important media for this communication is documentation and source code. It is not enough simply to establish standards for coding and documentation. Those standards must be continuously enforced via technical review and examination of all work performed by the software maintenance staff. In scheduling maintenance, sufficient time should be provided to fully update the documentation and satisfy the established standards and guidelines before a new assignment is begun.

The ideal programmer

Software maintenance is the lifeblood of a DP organization. Maintenance employees must effectively meet the challenge of maintaining a software system while keeping the users satisfied, the costs down and the system operating efficiently.

Maintenance is an activity in which everything that can go wrong eventually does. Problems will surface and enhancements will be requested for as long as the system is used.

The maintenance programmer's task is difficult, both intellectually and technically. Maintenance employees should be extremely knowledgeable about the system before attempting to change it. They must be able to analyze the problem and its impact, determine the requirements and design changes necessary for the solution, test the solution until the desired results are obtained and then release the revised software to operations or users.

The maintenance programmer also serves as the intermediary between application systems support staff and users. Unlike development, maintenance cannot start with a clean slate: It is affected by decisions already made and work already done. It often takes a great deal of time and patience to analyze users' needs and the system and then carefully and adequately implement changes.

Although it is the most important function of an application system software support activity, software maintenance receives far less attention when it is done well. It deserves to be recognized not just when it fails but when it succeeds. •

TAKING CHARGE

David Ludlum

Users slip their bonds

"The proletarians have nothing to lose but their chains."

Karl Marx wrote those words in trying to rally laborers of the 19th century to escape the hardships and drudgery that characterized much of the work of the early Industrial Age.

More recently, users of information systems have sought to escape the ties that have bound them to MIS organizations as desktop computers offered liberation through the power of individual processing.

One of the roots of Marx's theory was the principle of the dialectic advocated by the German philosopher Georg Hegel. *Webster's Ninth New Collegiate Dictionary* defines it as "the Hegelian process of change in which a concept or its realization passes over into and is preserved and fulfilled by its opposite." The idea is that one development tends to generate a reaction in the opposite direction, creating a process of compromise that can be likened to a swinging pendulum.

Whatever the merits of Marx's application of this notion to history, the concept seems to portray the conflict between managers of information systems and end users and may provide a glimpse of things to

Continued on page 94

Guide slates forum on 1990s

Symposium to compile variety of views on MIS-user relationship

BY DAVID A. LUDLUM
CW STAFF

Guide International Corp., the independent group for users of large IBM systems, will sponsor an international symposium in September to explore issues that will affect the management of information systems in the 1990s.

The symposium, to be held in San Francisco, is directed at members of nine organizations for users of IBM equipment worldwide and will feature addresses by chief executive officers, information systems executives, authors, economists, government officials and four IBM group executives.

The speakers include David T. Kearns, chief executive of Xerox Corp.; Frederick W. Smith, CEO of Federal Express Corp.; former U.S. Sen. Paul Laxalt and former Federal Communications Committee Chairman Mark Fowler, who will speak on the government's role in information systems; U.S. Sen. Frank Lautenberg (D-N.J.), speaking on information technology in government; and economist Arthur Laffer, who will speak on how world economics affects information systems.

The Information Systems Perspectives Symposium is open to employees of corporate members of Guide; the International Users Group Council; various international affiliates of Guide and Share, Inc. — another group of users of large IBM systems; Common, a group of users of smaller IBM systems; and the National Rolm User Group.

In a letter to Guide members, James J. Pitchell, past president of Guide and chairman of the symposium, suggests information systems managers attend with senior executives to address the effect of information technologies on corporate strategies, including questions such as whether the technologies are strategic and whether information systems managers can communicate effectively with users.

RESPONSE-TIME GUARANTEES

Avoiding contract disaster

BY LEE GRUENFELD
SPECIAL TO CW

Disputes between buyers and sellers of computer systems are almost never the result of bad faith but of bad contracts.

The simple truth about contracts is that the more that gets out on the table and written down — and the sooner in the acquisition process that occurs — the greater the probability of a successful installation. And while it is true that hammering out a detailed contract has caused more than one deal to fall through, it is better to part company at an early stage than after the waiting disaster has occurred. Nobody ever lost out by getting a lurking misunderstanding out in the open.

Even so, in many agreements between

Continued on page 88

CHRIS DEMAREST

Big bucks for on-line experts

BY DAVID A. LUDLUM
CW STAFF

A shortage of programmer/analysts and systems software specialists with expertise in on-line transaction processing is leading companies to search worldwide for the experts and pay them annual salaries of $75,000, according to a recent survey.

Firms across the U.S. are having difficulty finding data processing professionals with experience in configuring and supporting automated teller machines, retail point-of-sale applications and reservation and transaction systems for airlines, hotels and car rental agencies, according to Edward Perlin Associates, Inc., a New York compensation consulting firm.

Some companies are paying as much as $75,000 a year for employees with five years of experience working with specific on-line transaction processing software packages, according to the firm's recent survey on salaries of DP professionals.

"It's difficult to find these people with four or five or six years of experience. We are seeing a few installations running with a separate salary structure from the rest of the corporation," said Roger O'Connor, a spokesman for Perlin. Companies are seeking such employees in Europe and particularly in England, he added. "There is a good degree of piracy going on."

The overall turnover rate for DP professionals this year remains about the same as the 17% level reported for last year, according to the survey.

MANAGERS ON THE MOVE

Melitta, Dollar-Dry Dock Savings appoint CIOs

Chalk up two for the forces championing the appointment of chief information officers. Two companies recently bestowed that title on newly hired information systems executives.

Melitta, Inc. in Cherry Hill, N.J., which sells coffee and coffee-making products and is the U.S. subsidiary of Melitta-Werke Bentz & Sohn in West Germany, has appointed **William Wacker Jr.** as chief information officer (CIO).

Wacker says the significance of being CIO is that he reports to the subsidiary's chief executive officer. He does so with three other executives: the vice-presidents for coffee development, plant operations and finance.

That relationship is appropriate, given Melitta's dependence on a commodity product, Wacker says. "The information flow is so critical, particularly in a market that is so competitive — coffee. In order to compete successfully, you must have information quickly and accurately."

Wacker says he is looking beyond management information, however. "Marketing gets very little out of data processing, and that's got to change," he says. "Distribution is very important. If you can't get distribution, you're dead in the water, because it takes some time to fill the pipeline. If your ad is on the

William Wacker Jr.

air and you're not in the stores, you've just wasted every dime."

One move Melitta may make in that area is equipping the sales force with laptop computers. "This way the people in the field have a little more timely information," Wacker says.

Wacker studied accounting at Rutgers University in New Jersey and first worked for Melitta in that field. He later took over the data processing systems as an independent organization after he had been asked to set the systems up.

He left Melitta and worked as a consultant and a systems engineer for IBM as well as director of data processing for Resorts International Hotel, Inc. in Atlantic City before returning to Melitta as CIO.

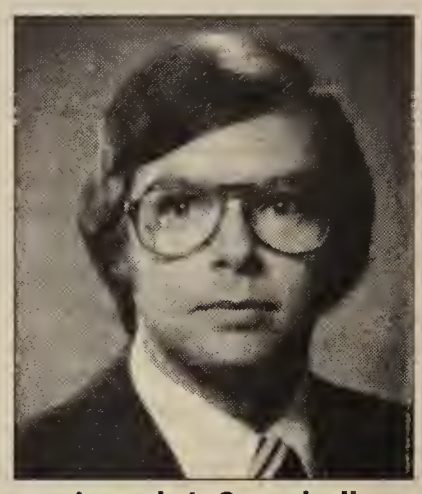
In a telephone interview, Wacker's comments suggested he gets involved in business issues at Melitta, such as marketing. "Grab the coffee some day," he says. "You won't believe the difference."

Dollar-Dry Dock Savings Bank of New York in White Plains, which has assets of $4.3 billion, has appointed **Joseph J. Campbell** senior vice-president and CIO, with responsibility for systems development, computer operations, computer telecommunications, information systems client services and check processing.

Campbell says the significance of having a CIO is that the head of information systems is elevated to "a more corporate level," taking on strategic planning and integration of the information systems plan with the corporate plan.

"Before, [the role] was to try to support. Now there's a recognition that information systems are an integral part of delivering the bank's products," he says.

That is relevant to Dollar-Dry Dock because it is in the process of converting 23 traditional bank



Joseph J. Campbell

branches into what Campbell calls financial centers, which offer brokerage services, insurance and travel services.

The bank's information systems organization will provide employees with tools aimed at saving time for customers, Campbell says.

He adds that his chief project is developing a systems strategy that, he says, will help turn tellers into "more marketing-oriented salespeople" by automating relatively mundane accounting functions.

Campbell, 40, received a degree in economics from Allentown College of St. Francis de Sales in Pennsylvania and spent 18 years working for Chrysler First, Inc. (previously Finance America Corp.), where since 1981 he had been vice-president of corporate systems planning and development.

He also appears to have a flair for marketing. "We're moving in the direction of the bank of the future," he says of Dollar-Dry Dock's corporate plan. "We're putting it into today."

Benjamin J. Costa has been named vice-president for information systems at **United Stations Radio Networks** (USRN).

In the newly created position, Costa will be responsible for management information systems at the networks and will advise all departments on systems and procedures.

Continued on page 88

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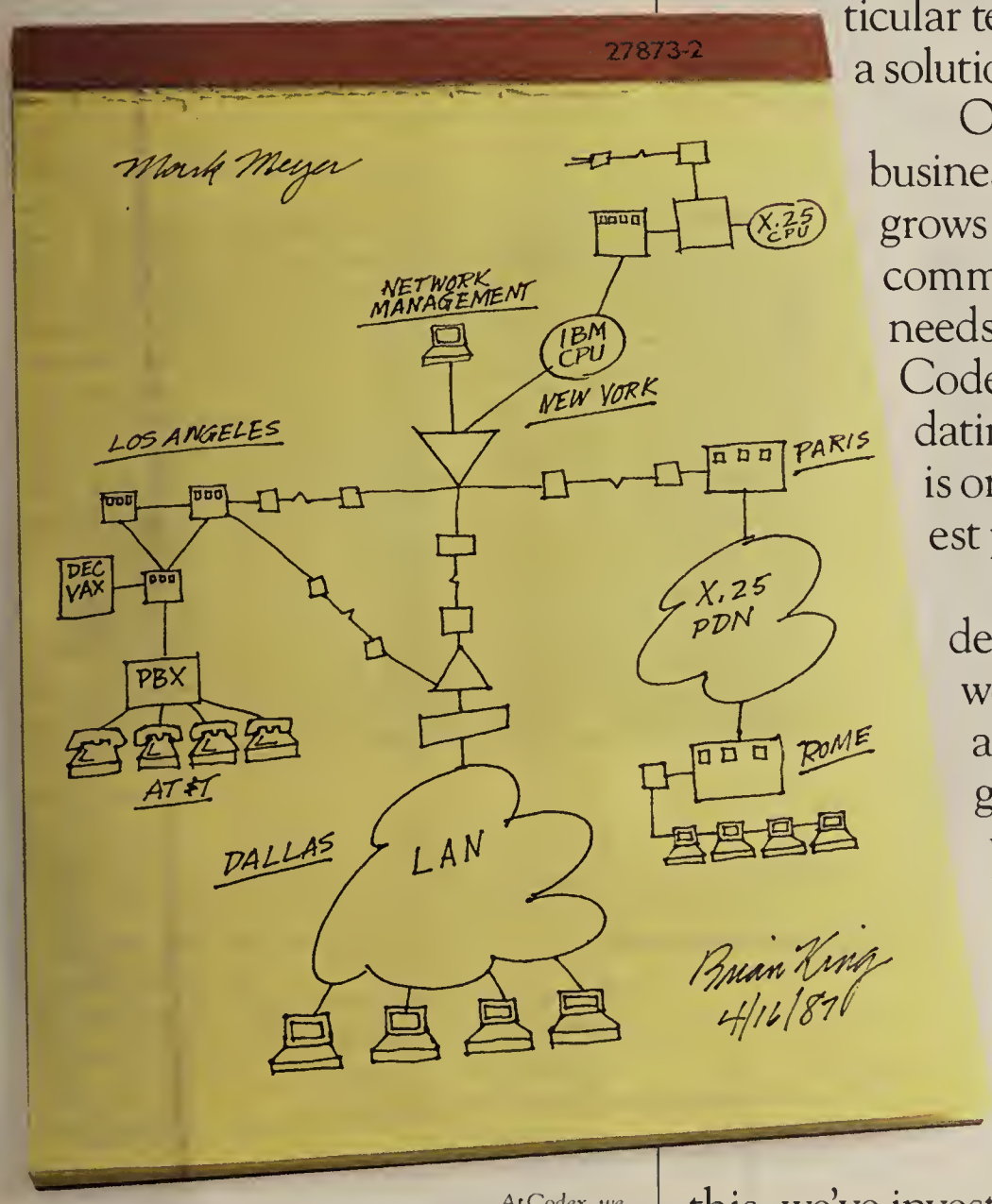

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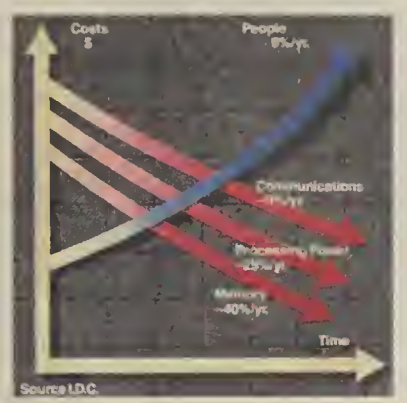

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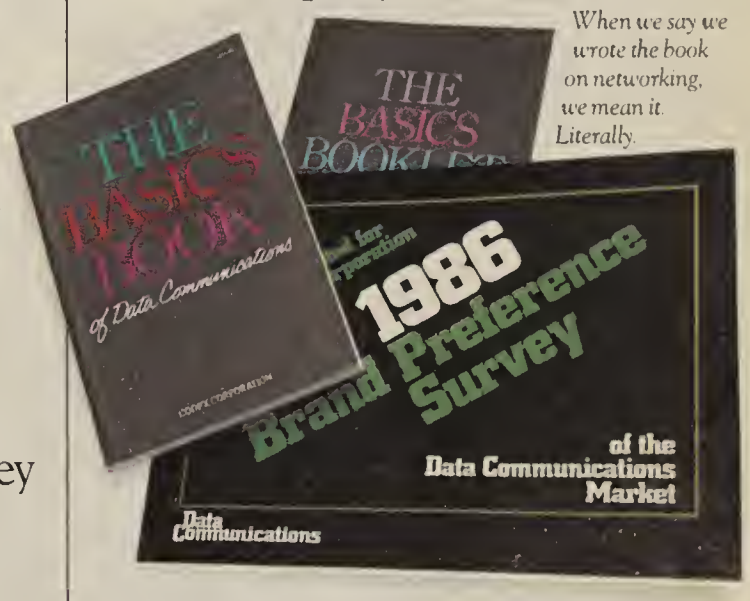

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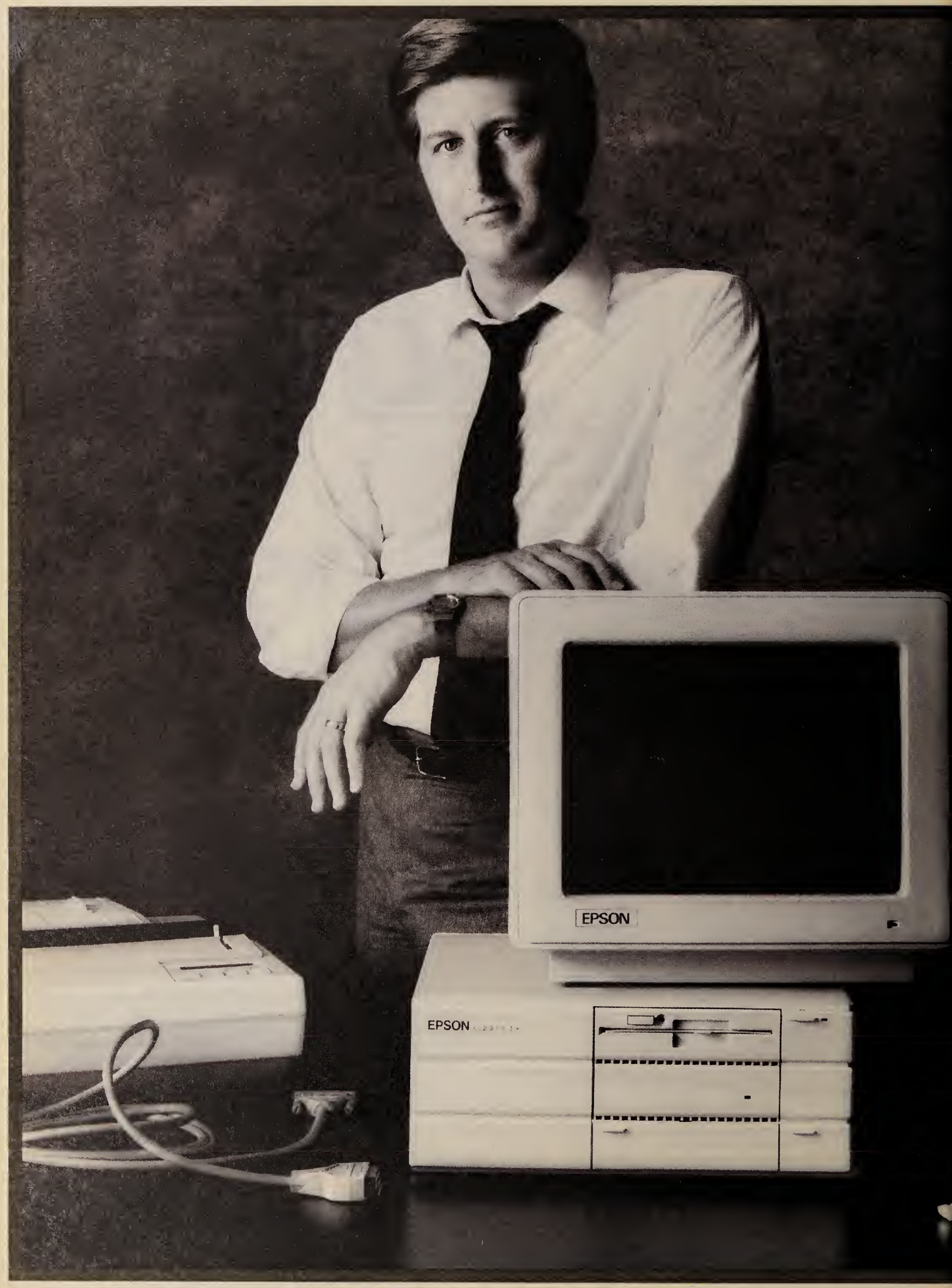

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Contracts

FROM PAGE 83

MIS and computer vendors — particularly in small- to medium-scale turnkey environments — one of the most vital aspects of system performance is still being overlooked, and that is throughput or response time.

System response time is the measure of how much work can be pumped through an on-line system per unit of time. And the failure of the system to live up to its throughput expectations can be as serious as failure to meet its functional goals. Consider the following scenario:

Ace vs. Superior

Ace Manufacturing contracts with Superior Systems for the delivery of a turnkey system to automate Ace's manufacturing and distribution functions. Superior recommends a HAL 90 computer to go with its off-the-shelf software package, which it demonstrates to be a perfect fit for Ace's business requirements.

Superior readily agrees to incorporate the user manual into the contract, which guarantees that the software will perform as represented. Superior's price is substantially below that of its closest competitor. So far, both parties are acting in good faith with the best of intentions.

After the system is installed, Ace complains of response times so slow that the company cannot get all of its on-line transactions in during a normal business day.

Superior responds that it only expected 16 on-line terminals, and Ace is using 32. Furthermore, reports and utilities are being run during the day; everyone knows that should not be done.

Ace counters by saying that Superior had access to knowledge of Ace's normal business practices and should have known better. Superior looks at the system and says response time is actually pretty good. If Ace wants it faster, the company has to move to a Model 95. Ace says that had it known, it would have picked a competitor.

And on and on. This dispute cannot be resolved simply, because no objective definition of throughput performance exists. Ace and Superior will probably wind up in court; one of them will lose, and neither of them really deserves to.

One possible solution to this problem would have been for Ace to solicit a guarantee of on-line performance prior to signing the agreement.

However, Superior might have balked at the notion because of all the vagaries of attempting to define performance and all the liabilities attendant on breaching the agreement. This is perfectly understandable not only because it appears that all the risk is with the vendor but also because it adds to the complexity of marketing: Superior would be forced to walk a tightrope between keeping its bid competitively low and protecting itself against the fairly serious consequences of nonperformance. Further, a prospect's estimates of its own requirements are often notoriously inaccurate, and how can a vendor be responsible for that margin of error?

On the other hand, Ace needs to be sure that the vendors are not proposing dangerously underpowered hardware in order to keep the total price attractive. Otherwise, Ace would have no way of knowing whether it will get stuck with a sizable bill for a hardware upgrade, which it must swallow if it becomes operationally dependent on the system before the problem is discovered.

A much more serious situation would ensue if the initial hardware configuration consisted of the most powerful computer in the line. Still, Ace is skittish about predicting its own needs in quantitative terms.

Both buyer and seller face serious dilemmas. MIS doesn't want to buy a system without some assurances of performance, and the vendor is reluctant to commit to throughput guarantees because of the vague nature of the buyer's description of its business environment and the difficulty of trying to predict system performance.

Logic is on the buyer's side, particularly if he is a relatively naive user procuring a turnkey system — hardware and software — and relying solely on the vendor's representations in making his decision. The vendor is the only one fully knowledgeable about all aspects of the intended system and therefore is the only player in any position to make a determination as to throughput performance.

The buyer's only choice is to take the vendor's word and cement it into a contract, thereby trading his system naivete for some solid legal protection.

The vendor must do the same — that is, obtain from MIS an objective definition of the business environment, translate it into an artificial test environment and get MIS to agree that such a test, not the live environment, is the objective definition of performance. In this way, the vendor is not subject to any imprecision or inaccuracy on the part of the user in defining his needs.

Thus, the vendor assumes the responsibility of knowing his product, and the user assumes the responsibility of knowing his business. This is as it should be and forms the basis for a workable response-time guarantee.

How it should work

In the request for proposal, the buyer should state clearly that the vendor will be expected to commit to a specific level of performance as part of the agreement. This puts all bidders on notice that a response-time guarantee is expected, so they are all on equal footing when they propose.

The buyer is obligated to quantify salient features of his intended automated environment in order for the vendor to have enough information to make a reasonable determination as to how its system will perform. For example, Ace might state that its peak burden will consist of six terminals running order entry, three running pick lists, three applying cash and six generating shipping labels.

Superior can then state that its software, running on the HAL 90, can achieve full-transaction average response times on the on-line terminals of two seconds or less 90% of the time, with no transaction exceeding four seconds. This may only be measured in a carefully specified test environment. Live operation has no bearing on the vendor's responsibility.

The buyer is responsible for determining that this test situation is a fair representation of his peak processing burden. If the vendor can demonstrate compliance with these test requirements, the issue is closed.

The actual wording and conditions are more complex than this simplified example, but the point should be clear. Without an objective definition of acceptable throughput, neither party has any clear recourse in the event of a dispute involving failure of the system to perform adequately.

The nature of the vendor's response-time commitment enters into the buying decision. If the vendor backs up the guarantee with a promise to buy additional hardware — at his own expense if necessary — his bid is figured with whatever machine is quoted. If the vendor offers to buy hardware only after the customer has paid a certain amount or offers to sell additional hardware at his cost or to split the difference, the buyer will probably value the bid at a figure higher than the initial quote.

If there is a throughput guarantee but no specified remedies, that is as good as no guarantee at all. The odds are that the issue will be wrestled in court, which essentially kills any chance of coming to a satisfactory and reasonable business solution.

How it really works

How does this work in actual practice? Vendors are extremely reticent to discuss the matter at first and dismiss the need for a guarantee. However, they typically respond positively to the logic underlying the request, especially when they understand that all proposers are being placed in the same circumstance.

Second, this procedure almost always brings up issues that would otherwise never be uncovered. Flaws and "additional considerations" in benchmark citations have a way of appearing, along with a raft of qualifiers as to performance promises. The MIS professional usually takes a sharper pencil to his estimates of system demand and occasionally discovers that a larger machine was probably warranted all along. In some cases, a seemingly closed deal is thwarted as skeletons come out of the closet.

One tactic employed by buyers is to purchase less than the recommended configuration, knowing that the vendor may have built in some cushion. If response time is too slow, the buyer is responsible for upgrading to the recommended level, and the vendor is responsible after that. Again, both sides win.

Gruenfeld is a management consultant in the Los Angeles office of Touche Ross.

Tips for writing a no-fault systems contract

Or how to avoid taking your vendor to court

- **O**utline — from the start — prominent, realistic characteristics of your prospective automated environment as unambiguously as possible.
- **S**olicit a guarantee of on-line performance from the vendor, regarding such features as system throughput and response time.
- **W**ork with the vendor to develop a fair test situation that will accurately predict the system's performance at your probable peak processing burden.
- **A**gree to specified remedies if performance guarantees are not met.

CW CHART

Managers

FROM PAGE 84

Costa joined USRN in 1986 as director of data processing. He has also served as director of MIS for Summagraphics Corp. and as MIS director for Staff Builders, Inc. and Boehringer Ingelheim, Inc.

Dale M. Chernich has been appointed assistant hospital director for information systems at the University Hospital of Pennsylvania State University's **Milton S. Hershey Medical Center**.

Chernich's duties include developing long-range information systems plans, evaluating operational and expansion plans and negotiating and controlling contracts pertaining to computer systems.

Chernich was director of client services, customer support and education at Dynamic Control, a division of Baxter Travenol Laboratories, Inc. In addition, he had previously served as

Benjamin T. Costa

director of information systems at Franklin Square Hospital of Baltimore and as a systems engineer for IBM.

Bobby W. Legg has been named vice-president for Information Services of the Fruehauf Trailer Operations of **Fruehauf Corp.**

Legg most recently served as director of financial systems. He also had been vice-president and controller of the Hobbs Division after joining Hobbs/Fruehauf in 1969 as controller of the Hobbs Division.

In his new post, Legg will direct the planning and development of Fruehauf Trailer's information systems. Based at Fruehauf's headquarters in Detroit, he will report to the president and chief executive officer of Fruehauf Trailer.

Robert E. Prothero, vice-president of information systems technology for Ameritech, has retired after a 34-year career in telecommunications.

No successor was named for Prothero, 58, who has served as an Ameritech officer since 1985.

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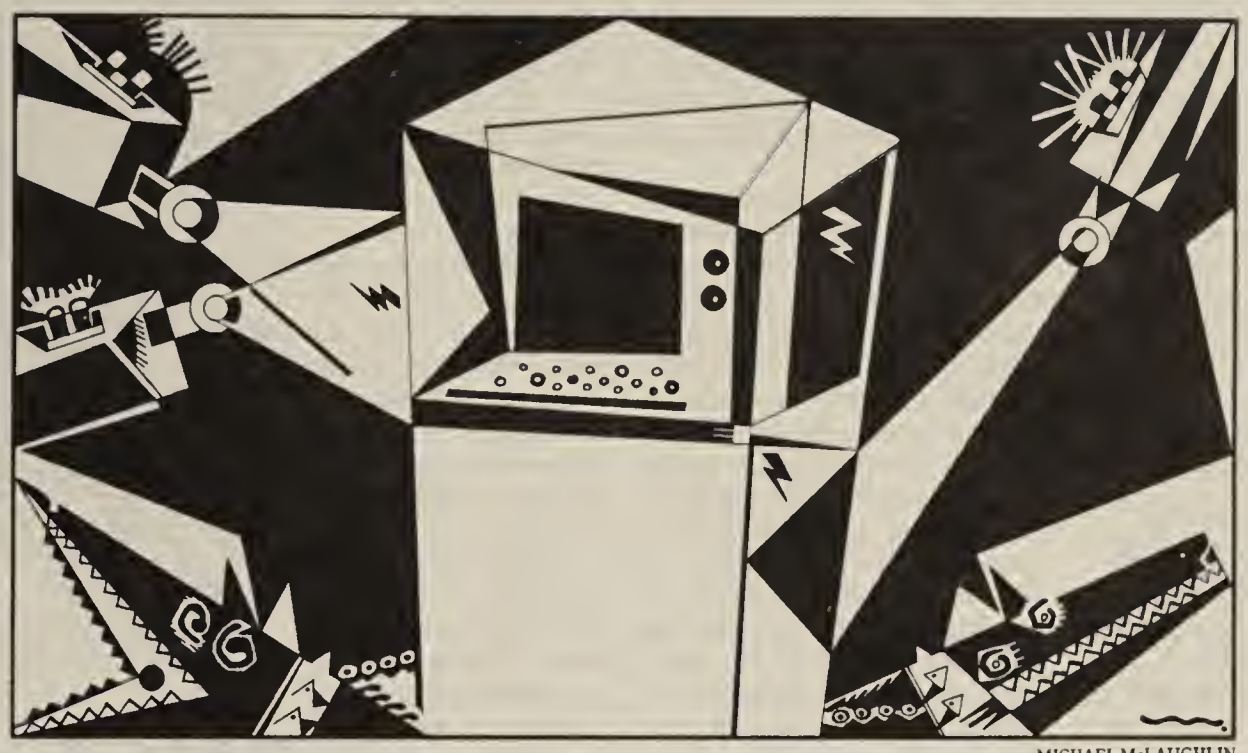
Data that resides on micros is now so valuable that organizations are forced to reevaluate their security policies.

WARDING OFF PC THREATS

BY MARY H. AINSWORTH



MICHAEL McLAUGHLIN

Personal computers have grown into too large and powerful a phenomenon to remain uncontrolled and on the loose. A large part of the allure of PCs, from the very beginning, has been the freedom they permit from outside control. Their low cost and ease of use made them a viable bypass method for departments eager to avoid traditional organizational constraints that governed data processing equipment's acquisition and usage. Furthermore, for a long time, because the information-handling capabilities of these machines was limited, some felt this skirting of security boundaries was harmless.

Now, however, many PCs sitting unguarded on desktops can, and do, process huge volumes of data, and micro-to-mainframe links give users an electronic key that renders the sophisticated lock on the computer room door virtually anachronistic. Given these risks and exposures, many organizations are beginning to realize their mainframe- and minicomputer-oriented data processing controls are out of sync with reality.

Defense contractor Rockwell International Co. in Seal Beach, Calif., has composed what it calls a "recipe for big trouble," which summarizes many of the vulnerabilities that organizations are starting to feel. "Use remote-access distributed data systems to electronically transfer information among separate locations," Rockwell's recipe says. "Mix in millions of personal computers. Sprinkle with a computer-wise generation."

Consider that the Bureau of Labor Statistics is predicting a quantum leap in the number of employed computer users from the current level of 525,000 to 900,000 by 1990 and it will be easy to see why there is a sense of urgency building around this brew.

Recognizing a problem and acting to correct it are, of course, two completely different matters. Rockwell is addressing the problem of microcomputer security, as are a number of other major organizations. But, according to Carl Jackson, president of the Information Systems Security Association and director of computer security at Ford Aerospace and Communications Corp. in Irvine, Calif., the vast majority is still reluctant to make any sudden moves. "Establishing and maintaining PC policy is such a hard job," Jackson says, "that most organizations don't want to face up to the problem."

Even those furthest ahead in taking action to confront the issue are, for the most part, still in a start-up mode. The Department of Commerce, for example, began wrestling with the threat of microcomputer data loss in their organization last summer and has had an actual control policy in place only since March.

"A security leak in a nonmicro area alerted the department to the vulnerabilities of microcomputers and the need for PC policy," says Reed Phillips, director of the Department of Commerce Office of Information Resources and Management. According to Phillips, that incident served to bring to a head concerns that already existed about information downloaded from the mainframe to the PC and about microcomputers and diskettes that employees took home for

Ainsworth is a senior associate editor for "Datapro Reports on Information Security" in Delran, N.J.

PC threats

FROM PREVIOUS PAGE

after-hours department work.

Developing a policy for control of microcomputers was a team effort at the Commerce Department. The committee was chaired by Phillips and included a microcomputer specialist and a computer policy specialist. After a first draft of each policy was completed, the drafts were circulated to the bureaus responsible for implementation and daily administration for their review and comments.

Never-ending effort

The bureaus' involvement was no rubber-stamp exercise, Phillips emphasizes. "After the bureaus returned the first version of the policies, we went through a major rewrite," he says, adding that the same process was repeated with the revised policy. It is important, Phillips says, to involve those who have to live with the policy in its creation. "Otherwise, you may never get it implemented," he says.

> "USERS see PC security as a bureaucratic burden unless companies use a strong awareness program."
>
> CHARLES CRESSON WOOD
> CONSULTANT

It took between six and nine months for the Commerce Department to develop and institute the regulations to govern its microcomputer population. But the effort does not end there. The policies are scheduled to be reassessed early next year by the department's inspector general to ensure that they are still timely and have made the transition from paper to practice.

To make sure its security policy lives and breathes at the user level, the Commerce Department is developing a small nontechnical pamphlet of user guidelines. "Policy should be flexible, viable and frequently updated. If you make policy either too restrictive or too lengthy, it will be ignored," Phillips cautions.

Because protection of DP centers has been the subject of formalized procedures for years, data processing staffs accept security as part of their routine. However, controlling information is a new responsibility for most members of non-DP departments, one they are often inclined to regard as an unnecessary addition to their work load.

"Users see PC security as an additional bureaucratic burden unless companies use a strong awareness program — and firms don't do enough awareness training," says Charles Cresson Wood, a San Francisco-based consultant. Wood sees increased interest PC policy creation, but after policies are written, he finds little compliance checking. "Of course, this is an industry-by-industry thing," he says. "Organizations that are regulated are doing a better job."

Spreading the word

At Rockwell International, where more than 10,000 PCs now reside, developing awareness about security is considered at least as crucial as formal regulations, according to data security officer Harold Tipton. "Written PC policy is essential," Tipton says, "and equally critical is a user awareness program to support the policy."

In fact, an awareness program for top managers involved in the development and implementation of the policy entitled, "Computer Security and the PC Explosion," of which Rockwell's "recipe" excerpt, quoted above, is a small part, was the groundbreaker in an ongoing policy development effort. The program explored security problems associated with micros in order to help managers responsible for developing and implementing policy to determine the measures needed for adequate protection as well as the scope of their own responsibility.

In addition to presenting a detailed series of questions designed to increase understanding of exposure at this level and to sharpen the skills necessary to deal with them, the program posed some direct challenges to managers. "Managers must overcome the feeling that security procedures constrain people, reduce performance and get in the way," the Rockwell group was told.

Concurrent with the preparation of its formal PC policy, which will supplement an already existing policy aimed chiefly at protection of minis and mainframes, Rockwell is working on a PC security video for user training purposes.

Policy drafting, which is the responsibility of the computer security department, has been going on since the beginning of the year. When the writing phase is completed, the results will be reviewed by management in the information systems and engineering departments. Although the process may seem lengthy, Tipton says the incremental change is ultimately more effective. "It is best," he says, "to secure one area at a time. Users resist change, and if you try to secure everything at once, you wind up with a revolt."

Banc One's approach

"Banc One places the responsibility for writing PC security policy within each department,"

Continued on next page

Cards offer smart answer to controlling micro access

BY G. BERTON LATAMORE

This summer, New York Life Insurance Co. of Canada Ltd. in Toronto is auditioning something new in microcomputer access control — a credit card-size device with an embedded computer chip that promises to separate authorized from unauthorized data and shield highly sensitive information.

The data protection device, the CP8 Micro Card, was provided to New York Life by the Royal Bank of Canada as an adjunct to its new financial management service, Cash Command.

Cash Command is a personal computer-based application that allows Royal Bank's corporate customers to perform a variety of cash management and treasury management analysis functions using real-time account balance information downloaded via modem from the bank's mainframe data bases.

NANCY ACKERMAN/GAMMA LIAISON

> "YOU WANT to hit a security level somewhere between wide open and a NASA launch site."
>
> DAVID ROGERS
> NEW YORK LIFE'S
> INFORMATION SERVICES DEPARTMENT

David Rogers, vice-president of New York Life's Information Services Department, says Cash Command is far ahead of any other fund management offering he has seen. The information that Cash Command allows customers to access, however, is also extremely sensitive. With Cash Command, corporate officials at New York Life can draw down the latest information about company accounts and stock portfolios, store it on their PCs and plug the figures into a spreadsheet program for analysis.

Naturally, New York Life is not eager to have users store extracts of that information on their PCs for analysis unless the system can guarantee a reasonable degree of security for the data. Micro Card supplies the necessary level of security without consuming processing power on the user's PC. To use it, card holders insert their cards into small Micro Card readers attached to their PCs and enter their personal identification number (PIN) on the keyboard.

When an authorized PIN is entered, the card checks its program to see what portions of Cash Command the user is authorized to see and what the user is authorized to do, whether to just see the data, manipulate it or add and delete. It then unlocks only the specified functions. Thus, someone with authority to conduct an analysis of the company's present cash status may not be able to look at the corporate stock portfolio.

If an unauthorized person tries to fake the PIN and enters the wrong number three times in a row, the card disables itself permanently and must be replaced.

The card is a product of Dallas-based Micro Card Technologies, Inc., a division of Groupe Bull, the French computer giant that has spent $50 million developing smart-card technology.

The erasable programmable read-only memory chips that make up the heart of smart cards include both their own processing power and up to 64K bytes of random-access memory (RAM). The cards were invented in France in the mid-1970s and have been aggressively developed there with the backing of the French government. In fact, millions of these smart cards are in circulation in France, serving as electronic credit cards and checkbooks, telephone charge and debit cards and security devices.

While word of the technology has spread to other countries and provoked substantial interest, the Royal Bank application is the first commercial use of smart cards as a computer security device outside France.

At the moment, according to Rogers, the only application for the Micro Card at New York Life is Cash Command access control, and only four people in the company — three financial officers and himself — carry the cards. He envisions the day, however, when all corporate employees will carry the cards, and at that point, they will become the standard data and physical access device at New York Life.

With 64K bytes of RAM, the cards can carry a digitized fingerprint or even a retinal scan, as well as the PIN, making them an excellent device for high-security access control. Employees can insert their cards into a terminal in the wall next to a door, tap in the correct PIN on a key pad next to the card slot and put their thumbs onto a fingerprint reader. If the print matches the digitized one, the door opens.

The best thing about the smart card approach, according to Rogers, is that it provides necessary protection without intruding unduly on the activities of legitimate users.

"No one knows for certain who is doing what on office PCs — and you may not want to know," he says. "You want to hit a security level somewhere between wide open and a NASA launch site so that your data is safe, but users are not inhibited from using their PCs to their best advantage. Smart-card [technology] is a way to manage that problem simply and inexpensively. . . . It's the smartest answer I've seen." •

Latamore is a free-lance writer based in Burlington, Vt.

PC threats

FROM PREVIOUS PAGE

says Robert Payne, statewide PC coordinator and electronic data processing (EDP) auditor at Banc One Corp. in Columbus, Ohio.

To guide the departments in setting policy, the EDP auditing group developed a set of written PC policy standards. Payne was part of the group that developed the standards in 1985. Since then, he says, financial and EDP auditors have participated in monthly and quarterly PC policy training sessions throughout Banc One's statewide locations.

In addition, he says, auditors play a key role in monitoring the departments to see that policy is, in fact, written and implemented. Payne comments, "The auditing group initiated written policy because we wanted to protect downloaded data and keep our customer information confidential."

The Banc One policymakers consisted of EDP auditing group members specializing in programming applications, auditing applications and technical integrity and control. They were led by the supervisor of the EDP audit department.

The group recorded the vulnerabilities of its microcomputers and set out to write policy for the most critical areas first. The committee's highest priorities were to control the acquisition of PCs and the data stored on diskettes.

When the first drafts of each policy were completed, they were routed to staff members for review. A final version of the policy was based on staff comments.

Policy-making is an ongoing process at Banc One. Members of the EDP auditing group meet monthly to fine-tune and add to the policy. Revisions can be proposed at the meeting and reviewed prior to implementation — a process that can take from two to three months.

Steps to secure PCs

Rockwell International Corp.'s awareness program for policymakers suggests the following ways to protect sensitive data on microcomputers:

- Purchase a streaming-tape drive or external hard disk if your personal computers are equipped with internal hard disks. Sensitive data should not be stored on a fixed hard disk.
- Determine the level of backup required for data and programs, separating these resources according to whether they need no backup, secure on-site backup or on-site and off-site backup.
- Train users to make and store backups of programs and data.
- Make sure that the security officer is available to consult with users.
- Require supervisors to audit PC backup activity.
- Assign a custodian for sensitive data sets.
- Store sensitive data on specially colored floppies or designated and marked removable hard disks.
- Store all media containing sensitive information in a cabinet or locked area that is accessed only by the data custodian.
- Place PCs that are used for work with sensitive data in private offices.
- Encourage the use of encryption for sensitive data files.

On the front line

Hughes Aircraft Co. in Long Beach, Calif., recognized the need to develop strong microcomputer security policies in 1983. William Boni, an in-house consultant at Hughes's Information Systems Security Department, helped write Hughes's policies and described this process in a report for "Datapro Reports on Information Security" titled, "Case Study: Controlling 2,000 PCs at Hughes Aircraft Corp." Boni discussed not only the steps taken to write policy but also suggested methods used to implement it.

How did Hughes do it? Corporate policy charged the Information Security Section with developing the EDP security program. The section evaluated threats to PCs and alerted management and vendors to the following security imperatives:

- Protecting company-sensitive data stored or processed on PCs from access by nonemployees and unauthorized employees.
- Preventing theft of proprietary models and data by disgruntled or unscrupulous employees.
- Preventing off-premises access without appropriate controls.

Members of the Information Security Section participated in all the areas in which computer security plans, policies or practices were formulated or implemented. This broad participation had two benefits: Section members became a recognized presence in the departments, and members gained a better first-hand knowledge of the security requirements of the departments.

The head of the Information Security Section was also a member of the EDP director's staff (a high-level reporting position) who had developed strong professional alliances with other managers reporting to the EDP director. Because of the section leader's strong ties to internal management, formal and informal security measures were easily implemented.

When a first draft of the security policy was completed, it was released in a bulletin signed by the director of information resources. This bulletin was sent to all department managers for feedback — and to alert them to the security concerns regarding PCs. The policy was later consolidated in a pamphlet that was included in the security orientation packet for all new employees. The pamphlet sets baseline controls for all employees, since Hughes projects that the majority of its staff will have access to its anticipated installation of 9,000 PCs by 1990.

> "EVERY user of a microcomputer is personally responsible for the protection of the information that the microcomputer stores, processes or transmits."
>
> FROM HUGHES AIRCRAFT CO.'S MICROCOMPUTER SECURITY GUIDELINES

The Information Security Section was also part of a Group PC Standards Committee at Hughes that established PC product configurations and furniture specifications. Affiliation with this committee allowed the section to test and select lockdown devices and to establish other product standards. To promote PC security awareness, the section installed its approved products on every PC in Hughes's Personal Computer Learning Center, where all new PC users are trained.

Other techniques designed to promote security awareness include labeling PCs and diskettes as either classified or unclassified. In addition, a 15-minute PC security awareness program is presented to department managers by the security staff. The program, which emphasizes PC users' personal responsibility to protect data and comply with company policies is also used in briefings for new employees.

Company plans include expanding data groupings beyond "classified" and "unclassified," developing on-staff tiger teams to test the system by attempting to breach it and conducting aggressive auditing procedures to track breaches.

Room for diversity

The four security programs discussed here share a number of characteristics:

- Planned or established policies for the acquisition of microcomputer hardware and software products.
- Designated individuals responsible for ensuring that PC security policy is enforced.
- Prohibited copying of copy-protected software.
- Required off-site storage of backup software and data diskettes.
- Required full documentation of software programs.

The programs also provide policies for power protection, controlling access to the PC and assignment of a PC coordinator responsible for security. Banc One and Rockwell state that all data produced with decision-support software, such as spreadsheets, must be tested and the results validated to ensure that a wrong entry in a cell does not skew the spreadsheet. The Commerce Department and Banc One both require departments to maintain an inventory of microcomputer hardware and software.

Despite these similarities, however, each policy clearly reflects the particular nature of the organization that formed it.

Both Rockwell and Hughes are aerospace companies that rely heavily on government contracts. Banc One is a financial institution that needs to protect customer data, and the Department of Commerce is a government agency that deals with both the public and private sectors. Because these organizations are required by regulation to provide information security, they are on the leading edge of PC policy development.

But what are some of the specific policy concerns at these organizations?

Hughes places heavy security responsibility on the individual user. The company's "Microcomputer Security Guidelines" brochure states that "every user of a microcomputer is personally responsible for the protection of the information that the microcomputer stores, processes or transmits." It also states, "Any employee having knowledge of a violation of the Microcomputer Security Guidelines must report it immediately to management so that corrective action may be initiated."

Banc One's financial concerns are reflected in its policies calling for the use of "due care" for PC processing of basic computer calculations, "great care" for decision-support applications and "extreme care" for applications that generate entries to general-ledger designing, testing, validation and documentation.

The Commerce Department forbids the use of its micros for personal use. Surprisingly, only Commerce — not government contractors Hughes and Rockwell — requires that Tempest-certified equipment is used for processing highly sensitive data. Tempest-certified equipment must meet special shielding standards set by the Department of Defense that ensure electronic emanations cannot be intercepted. Hughes, however, does restrict processing of government data to "systems approved by the appropriate U.S. government agency."

The Department of Commerce enforces two policies that deal with the destruction of

Continued on next page

Law enforcement

Robert Payne's EDP auditing department at Banc One Corp. routinely reviews selected departments to see that they adhere to the company's overall microcomputer security objectives. The questions that Banc One uses to gauge departmental follow-through can be easily adapted for use in other settings. These questions are as follows:

- Are administrative security procedures documented?
- Are administrative procedures for hard-disk and diskette backup documented?
- Are administrative procedures for off-site backup and storage documented?
- Does a written policy state when the user-based system is to be signed on and off and by whom?
- Are there written procedures to control the use of sensitive documents?
- Are there written departmental policies and procedures stating how and what to document for in-house-developed applications?
- Are eating, drinking and smoking prohibited in the immediate computer area?
- Is there a procedure for informing employees that corporate policy forbids the copying of copyrighted software, except for backup purposes?
- Is there a written policy in place regarding the removal of hardware and/or software from bank premises?
- Is there a written policy regarding the reformatting of the hard disk on leased or rented computers when that computer is returned to the lessor?

Starting points

Based on his experience implementing the personal computer policy at Hughes Aircraft Co., William Boni offers suggestions for anyone entrusted with planning for microcomputer security.

Motivate the end user. The distributed processing environment associated with PCs means responsibility for complying with data security practices is now passed on to the end user. Employees will generally comply with company standards when they know why a security program is necessary. Education, awareness and training are critical tools in the PC security program.

Work with the best available. Don't wait for a "silver bullet" to eliminate every PC security problem. Evaluate products in light of your commonsense appreciation of your own operational climate. Given the speed of progress in the security field, product and procedure evaluation will be an ongoing responsibility.

Remember that you cannot have security without reliability. Make sure security products perform as advertised before you purchase them. Also, select products from a reliable vendor; otherwise, when they need support or an upgrade, you may be on your own.

Build a solid base of support. Security staff must enjoy close working relationships with all key players in every major staff function concerned with PCs — DP managers, information center managers, the physical security department and line managers. All have legitimate interests in protecting PCs and the information they process.

Follow up on what you say. Ensure that all products and procedures are understood and consistently employed. Monitor compliance with established standards and report continued violations to appropriate management for action.

PC threats

FROM PREVIOUS PAGE

diskettes: one, those that contain "sensitive unclassified data will be purged of all information by either overwriting or reformatting before release to another office or individual without a need to know"; and, two, "diskettes containing classified data will be degaussed using an approved degausser or will be placed in a burn bag for destruction." Although shredding is not listed as an option for diskette destruction, many shredders do possess this capability.

Banc One is also concerned with the obliteration of data on leased hard disks. Its EDP auditors ensure that departments enforce written policy "regarding the reformatting of the hard disk on leased or rented computers when that computer is returned to the lessor."

Rockwell looks upon personal computers that access the host as a particular vulnerability. Much of the security program focuses on this concern, as well as on diskette labeling and whether diskettes are left in the machine unattended. Proper handling of reports produced on the micro, an often overlooked area, is another concern that Rockwell's program covers.

Banc One, the Department of Commerce, Hughes and Rockwell all used a group approach to write policy. Departments responsible for implementing the policy were either included in the policy-making process or were able to review and change first drafts.

> WRITING PC policy is a political task. It affects people, and people can work for it, work against it or simply ignore it.

Other tips for policy-making include the following:

- Appoint one person in the group to sort through disagreements and make a final decision.
- Conduct a risk analysis of the PCs and protect the most vulnerable areas first.
- Review security policies others have developed for PCs.
- Build an awareness program to support the policy.
- Review the policy regularly and make appropriate changes.

Employees cannot support a policy they know nothing about. Be sure they have their own written copies of the company's security policy. IBM not only provides its employees with written policies, but each year employees are required to read and sign them.

Managers should be well trained in PC security awareness so they can answer questions and set an example for their departments. Videos are popular devices for awareness training, as are brochures, posters and short meetings.

A policy for the people

Writing PC policy is a political task. It affects people, and people can work for it, work against it or simply ignore it. No PC policy will make everyone happy: Voices must be heard, compromises must be made, and work will become a little more tedious.

The Hughes awareness brochure offers the following thought: "The microcomputer has distributed the power of information processing to many users; this means that responsibility for correctly using these devices is also distributed."

It concludes by saying that employees who properly protect information safeguard the company's "ability to compete and prosper in a highly competitive business environment." •

Recognizing the enemy of corporate data

Computer fraud cost U.S. businesses between $3 billion and $5 billion last year, according to a report prepared by Big Eight accounting firm Ernst & Whinney in Cleveland for the Congressional Commission on Fraudulent Financial Reporting.

The cost of honest errors — deletion, incorrect entry or erroneous alteration of data — is much more difficult to quantify, but most experts agree that this cost is even greater than losses attributable to fraud.

Protecting data from tampering is a complex business, involving more than the installation of a standard security system. "There are no two key rules for making your data safe," says David R. Wilson, national director for information security services at Ernst & Whinney. "People are finding security concerns very hard to address."

One reason the process is so difficult, Wilson says, is that most companies have no idea what they are trying to protect when they install computer security. "Most don't know what they have. They can't possibly know how many personal computers they have. They're lucky if they know where all their mainframes are," he says.

Another difficult call is the assignment of security responsibility. Too often, Wilson observes, the responsibility is placed on MIS.

"Many companies decide, for instance, that MIS owns accounts payable," he says. "But MIS has no way of knowing whether the checks being written today are being made out to the correct people and sent to the proper addresses or are totally fraudulent."

Where risks lurk

When accountability has been established, it is time to evaluate risks. Data can be lost or altered either accidently by legitimate users or purposefully by employees or outsiders.

Direct interference from outside is the least of the major risks, largely because it is easier to get information on corporate strategies by going through a company's garbage bin or by bribing an employee than by tapping into the firm's data base. However, the risk does exist and is bound to increase significantly as companies create sophisticated systems for field personnel and customers and as they work to establish standards for electronic invoicing and bill payment.

Because these systems are designed to be accessed from the outside, the solution to the security issue is not just a matter of taking the system off-line.

A recent survey of corporate officials by Ernst & Whinney confirms that concern about outsider access is growing. "We think," Wilson says, "that the reason for the change is that corporations are using their systems more for competitive advantage rather than strictly for back-office functions."

There are, of course, also internal threats. Disgruntled employees may damage corporate data maliciously. And, because they offer a low-risk high-profit target, computers provide an opportunity for dishonest employees. All it takes to rob a company in many instances is to change the name and address on a check in the accounts payable queue.

Although computer crime grabs headlines, the greatest risk in most companies is attributable to honest errors, according to Robert H. Courtney, president of RCI in Port Ewen, N.Y., and a leading security expert. A company has to expect mistakes, he says. Unfortunately, when someone carelessly deletes or alters a vital piece of information on the main data base, the mistake is seldom trivial.

Growing exposure

The level of exposure to every kind of internal risk has grown exponentially since the start of the PC revolution.

In 1979, only a few technical people in the MIS department had access to data on corporate mainframes and minis. Now, everyone from the president to file clerks know how to log on to the system and change data.

An even more sobering thought is the number of PCs beginning to be linked into local-area networks, for which little protection exists.

Methods exist to ward off almost any type of threat. The question is how much an organization can and should expend on security, especially given that the costs do not consist of only direct expenditures for software and hardware; another cost is reduced efficiency. As security measures block illegitimate users, they inevitably slow down legitimate ones.

"If the probability that someone will break into your system is small and if the risk of loss if they do is also small, then you don't want to spend a lot on security," Lanagan says. "But if there's a 10% chance of someone breaking in and stealing $1 million, then it's worth spending $100,000 to protect your valuable data — and you can come up with a pretty good protection plan for $100,000."

G. BERTON LATAMORE

PRODUCT FACE-OFF

Encryption packages offer business users a choice

BY HAROLD JOSEPH HIGHLAND

Among the multitude of encryption software packages currently available for Microsoft Corp. MS-DOS- and IBM PC-DOS-based systems, three stand out by virtue of their particular suitability for use in the corporate setting.

Privacyplus from United Software Security, Inc. in Vienna, Va., is a general encryption program that permits a security administrator to decrypt any file. Redwood City, Calif.-based RSA Data Security, Inc.'s Mailsafe can be used where message authentication is of primary importance. Secretdisk from Lattice, Inc. in Glen Ellyn, Ill., provides transparent encryption.

Privacy Plus is a simple, menu-driven encryption program, which, when used with Automated Training Systems' companion program, Masterkey, offers one feature found in no other software and only a few of the more expensive add-on boards.

Masterkey enables a security administrator to decipher any encrypted data file or program without knowing the original encryption key. The administrator develops a configuration file of program options that can be called by Privacyplus. The file also contains the administrator's special master key in encrypted form. Along with this configuration file are separate disks of the encryption program, which are distributed to each user or department. In this way, the administrator has a different key to unlock different files.

Two encryption algorithms are instantly available for the user during any encryption session via a function key. In addition to the Data Encryption Standard (DES), an algorithm developed by the National Bureau of Standards in 1977, a proprietary algorithm runs two to three times faster. In addition, multiple encryption can be used with either algorithm or a mix of both.

The program can be made random-access memory (RAM)-resident. It requires about 57K bytes of RAM and can be called at any time by any of six two-key combinations. This avoids conflict caused by calling combinations of other RAM-resident programs.

Message authentication is the prime feature of RSA's Mailsafe, an encryption package that uses the company's public-key algorithm.

This algorithm uses two keys, which means the sender uses the recipient's public key to encrypt a message, and the recipient uses his own private key to decrypt the message.

The Mailsafe encryption system contains three programs: Install, Keygen and Mailsafe. Install prepares the user's RSA disk with a user-selected password or passphrase consisting of from eight to 80 characters. It then calls Keygen to generate the public key and the password-protected private key.

Mailsafe, the application portion of this encryption package, is menu-directed with numerous Help screens and is used to encrypt and decrypt files for storage and communications.

Message authentication is performed with this program. Using the outgoing mail menu, the sender presses a single-function key that directs the program to generate an RSA Digital Signature for a specific file. The user signature varies from message to message. Also, during the authentication process, the program verifies that the message is complete and adds a message digest of the exact contents of the file.

After the user presses another function key, the message and digital signature are compressed by a special data-compression algorithm and then encrypted using the recipient's public key. ASCII characters are added to this and act to seal the enciphered message in an RSA Digital Envelope.

The recipient of a message that uses the digital signature and digital envelope can decipher the message with his private key. The sender's signature is verified by the recipient using the sender's public key.

Transparent encryption

Secretdisk is a software program that offers the user transparent encryption, which means that no encryption key is entered by the user. The data stored on the disk is always in encrypted form and becomes available only through use of the proper user-selected password.

Secretdisk assigns a logical drive to each confidential disk, improving security by sectioning storage into limited-access areas. For example, three confidential disks can be created on a hard disk in addition to the basic root directory, which is open to all users. The secret disks would be accessed as Drives D, E and F, each with its own password.

During initial installation, the user can select either the DES or a fast proprietary algorithm. Encryption and decryption take place as the data moves from the monitor's screen to the disk or from the disk to the screen.

Even if someone illegally copies the secret disk files, the data will be protected. Because of the logical disk assignment, it is impossible to access the secret disk files unless the microcomputer configuration is duplicated exactly. Even then, the files cannot be read under DEBUG or any of the special utilities because they are encrypted.

The size of any secret disk is specified by the user in a given number of bytes. The number of secret disks on any system is limited by the number of drives addressable by the operating system. One installation program is available to convert an entire floppy into a secret disk. A portion of a floppy disk can be set up as a secret disk by using the hard disk install program.

Two utility programs with this package are available for the user to toggle a secret disk on and off. However, a password must be entered every time a secret disk is turned on. •

IN ADDITION to the Data Encryption Standard, an algorithm developed by the National Bureau of Standards in 1977, a proprietary algorithm runs two to three times faster. Multiple encryption can be used with either algorithm or a mix of both.

Highland is managing director of Compulit, Inc., an Elmont, N.Y.-based firm that tests microcomputer security products and consults on computer security issues. He is the editor of a bimonthly journal, *Computers & Security*, and has more than 40 years of experience in the computer security field.

Deciphering the selection of encryption products

Not all company data needs to be encrypted. Wholesale encryption not only wastes computer and employee time, it also makes sensitive encrypted data more vulnerable to attack by supplying would-be intruders with a better shot at unraveling the code.

Before introducing encryption, therefore, it is essential to classify information and programs according to relative sensitivity, using categories like "company secret," "company confidential" and "company restricted."

Secret data — data that should be seen only by top management — normally constitutes a very small percentage of an organization's total store of electronic information. This type of file should be encrypted when stored on a disk or back-up tape and when transmitted from site to site.

Confidential data, which consists of data files and programs restricted to selected employees or departments, can be protected by encryption or password-protected disks with transparent or keyless encryption.

Restricted data, information available to all employees but not the general public, can be adequately secured with data compression programs, which effectively prevent employees from copying disks to take off-site.

NOTHING is ever totally secure. The cipher machine used by the German military during World War II had 200 quintrillion possible keys, and it was cracked daily by the British intelligence team.

Choosing your security level

There is a plethora of encryption software and hardware products from which to choose. During the past three years, our microcomputer security products laboratory has received close to 100 encryption software packages, encryption boards and specialized replacement read-only memories for testing. Which specific product or products you choose depends on a number of factors, including the following:

- The amount of data that needs to be encrypted.
- The level of security needed by your organization.
- Budget constraints.
- Whether you plan to use the same encryption package for all of your company's sensitive data.

Some companies use the same encryption algorithm for the purpose of storing both confidential and secret data and for all data transmission, believing that the algorithm is completely unbreakable. Early this year, however, *Cryptologia*, a professional journal devoted to the practice of cryptography, published an article by Martin Kochanski in which he broke the encryption technique that was used in five popular personal computer packages, including Superkey from Borland International and N-Code from K Plus L Software.

Many companies turn to the Data Encryption Standard (DES) for ultimate security. The DES was issued in 1977 by the National Bureau of Standards and is available as software or in a chip on a board. The National Security Administration has raised doubts about the security of this algorithm, though, and within the cryptographic community, there is a strong feeling that the DES code has been broken.

Every algorithm uses a key, a set of characters that are either entered by the user or, in a few cases, generated by the algorithm. The DES has 70 quadrillion possible keys — that is, 70 thousand million million — making it seemingly unbreakable. But nothing is ever totally secure. After all, Enigma, the cipher machine used by the German military during World War II, had 200 quintrillion — or 200 million million million — possible keys, and it was cracked daily by Alan Turing's British intelligence team — without a supercomputer or even an old IBM 650 to assist them.

It is strongly recommended that a different encryption scheme be used for storing secret, as opposed to confidential, data and that still another scheme be used for data transmission.

Living within the budget

The cost per microcomputer to protect data can range from zero, using a public domain package, to several thousand dollars for sophisticated encryption hardware. In many companies, microcomputers handle only unclassified data, and these need not be secured.

Most people assume a high correlation exists between price and quality, but this assumption is incorrect in the encryption products field. Some companies trade on the misconception that cost equals value and set their prices accordingly. Others introduce their products at very low

prices, expecting to double or triple the price later, when demand develops.

Those vendors aiming to sell into government agencies and large corporations often establish high unit prices at the outset so they can offer large volume discounts.

Budget constraints may lead some companies to choose software packages rather than encryption hardware. Software encryption is slower than hardware but can be just as secure, depending on the algorithm.

Financial resources can be stretched by using public-domain or lower priced software for encryption and/or compression of a limited volume of data and by using encryption hardware to meet high-volume needs.

There is an extensive checklist of features that should be considered in evaluating encryption software or hardware. Depending on the company, some of the following features are more important than others:

- Is there a clearly written installation manual or, preferably, a menu-driven program on a disk to help the security administrator install the package?
- Is there a separate user's manual that can be copied for distribution to the staff, or is it necessary to write one in-house?
- Is the encryption program menu-driven for the user? Are there Help screens?
- Does the program provide for multiple encryption algorithms? Some are designed to offer the DES and a proprietary fast encryption algorithm.
- Can the encrypted data be sent without modification over telecommunication lines?
- Does the program verify its encryption? If not, it should not overwrite the original. An in-house procedure will have to be developed to verify the encryption before the original is destroyed.
- If the encrypted file is given a new name by the encryption system, does it overwrite the original or merely delete the file name from the directory?
- Is an audit trail of operations available for the security administrator?
- How many characters does the encryption key require? A program should not permit the use of any key consisting of less than six characters.
- Is there echo-on-screen control so that a passerby cannot read the key?
- Does the program make any provision for encrypted file recovery by the security administrator if the user who originated the key becomes suddenly unavailable?
- If access control is offered, how easily can it be defeated by the average user?

The evaluation process

After a review of manufacturers' literature and the completion of a checklist of desired features, several products should be secured for testing.

All products should be tested under identical conditions that reflect the most typical microcomputer configuration used.

The time required to install the hardware or software package should be noted during a series of timing tests for each encryption product. The time required to encrypt and decrypt 5K-, 10K- and 50K-byte ASCII text files should be determined, and, if there are software programs that have been written in-house, two typical programs should be timed both in source and executable code.

If graphics are used extensively, some of these programs should also be time-tested as well.

> SOME boards and packages will function well on one machine but then falter when transferred to an identically configured machine from another manufacturer.

Timing tests should be run with the test data on both floppy and hard disks. If the microcomputer configuration has a random-access memory (RAM) disk, test that as well. Encryption of 10K-byte ASCII text files generally requires about 30% to 40% less time on a hard disk than on a floppy. Timing tests using a RAM disk show about a 50% time savings over a floppy.

Watch for variables

After the basic data has been obtained on a typical machine, select two or three of the most likely encryption choices, and test several of the files and programs on other machine makes and configurations. It has been our experience that some boards and packages will function well on one machine but falter when transferred to an identically configured machine from another manufacturer.

Machinery is not the only variable that can affect performance. We have found encryption software and hardware are also affected by different versions of the same operating system, differences between the same versions of IBM's PC-DOS and Microsoft Corp.'s MS-DOS and different makes of memory expansion boards.

Proper evaluation is a lengthy procedure. If a company uses one brand of microcomputers and similar configurations throughout its organization, it will take about six to eight hours to conduct a single product test.

If there is a considerable mix of machine makes and configurations, however, it may require a company up to three or four days to conduct a complete evaluation of a single product.

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Avoiding sins of transmission: Ethics for the corporate network

BY RON SCHNEIDERMAN

Ethics. It's a subject very much in the news today. And the news isn't good.

We hear about ethical deterioration in politics (the Iran-Contra affair), religion (Jim Bakker's PTL Club) and business (Wall Street's insider trading). And now, ethical drift is something that has to be considered in connection with microcomputing and microcomputer networks.

The most common security problems today have little to do with hackers, terrorists or even organized crime. The more likely threats, according to security specialists and several recent studies, are posed by internal fraud and sabotage committed by disgruntled employees — someone, for example, who may have been passed over for a promotion or someone who didn't get the office by the window.

A recent study by International Resource Development, Inc., a Norwalk, Conn., market research organization, indicates that while corporate data processing managers at large companies used to be concerned about security breaches originating outside the company, they now realize that the greatest threat may be from their own employees. "In talking with top DP managers," the study says, "it repeatedly emerges that the disgruntled or dishonest employee is viewed as 'Enemy No. 1.' "

The federal government's own statistics indicate that only about 5% of its data security problems are caused by hackers. The government's main problem is abuse and misuse by its own employees.

Wire pirates

The trend toward networked computers increases opportunities for mischief and moral lapses. Some 220,000 local-area networks (LAN) will be installed this year worldwide, according to analysts at International Data Corp., a Framingham, Mass.-based market research firm. Those figures are up from 52,000 in 1984.

But workers may be using networks in ways that their companies never intended. And when it comes to sharing information on a network, issues of property rights and entitlement arise that blur the rules and sow seeds of mistrust.

"Networking, more than anything else, has caused the end of the old expectation that we're all friends," says Stephen Walker, president of Trusted Information Systems, Inc., a consulting firm active in commercial and government security work.

A team of faculty members at the Stevens Institute of Technology in Hoboken, N.J., recognized the problem while conducting a study for the National Science Foundation in Washington, D.C. The project, called Ethical Implications of Computer Networking in Science and Government, found that the "need to know" has become so strong among members of the scientific community that many authors of scientific papers distribute "preprints" of their research results before their papers are published. The project predicted that networking will facilitate this trend.

This practice is bound to raise a number of ethical issues revolving around ownership of data, according to I. Richard Lapidus, a physics professor at Stevens Institute and study team member.

"In a networked environment, where investigators may be required to make their raw data available to other scientists," he says, "disputes about ownership will become commonplace, and a set of rules will have to be developed to resolve them."

> "NETWORKING, more than anything else, has caused the end of the old expectation that we're all friends."
>
> STEPHEN WALKER
> TRUSTED INFORMATION SYSTEMS, INC.

In fact, the potential for abuse in computer networking, particularly where plagiarism is concerned, was addressed (albeit briefly) in a federal government report, "Intellectual Property Rights in an Age of Electronics and Information," published last year.

The report points out that, since computer networks allow on-line creation and collaboration in a haphazard and informal fashion, each contributor may be anonymous and his contributions, unrecorded. Under these circumstances, the authors ask, who has a right to claim ownership of a work if it becomes commercially valuable? What is to prevent business and scientific or engineering professionals, or others in the workplace, from using information from someone else's report or memorandum for their own gain?

Battening down the LAN

The National Computer Security Center (NCSC) in Fort George G. Meade, Md., has worked out a set of guidelines for securing computer networks, to be published in August. Known internally as the "brown book" and based on interpretations of the NCSC's Trusted Computer Systems Evaluation Criteria, or "orange book," these guidelines are in demand. Agency officials have received several queries from large corporations, mainly insurance companies and banks, expressing interest in adapting them for their own use. Among the book's contents are sections covering integrity of and denial of access to LANs.

Several Fortune 500 companies have also expressed interest in a secure LAN developed by Verdix Corp. in Chantilly, Va., for the NCSC. Verdix has already installed at least two of the networks at defense contractors' facilities.

Gaurang Shah, Verdix's director of marketing, is not surprised by the interest. "You can't have the R&D department on the same network with accounting and payroll," he says. "That's the way it works in many places, and it doesn't make sense. There are too many opportunities for abuse."

Unlike the government, the commercial world normally does not classify its information, and that, according to Shah, is a big mistake. "Top management should be allowed access to just about any of the company's computer data, but that's not true of others in the company," he says.

In the user's hands

Who is responsible for ensuring that traditional ethical values are applied to network users? Currently, "it's an MIS responsibility," says Don Monoco, a managing partner at Chicago's Arthur Andersen & Co., an accounting and management consulting firm, and head of the company's Advanced Systems Group.

"But I don't think it's being addressed adequately today," he says. "MIS has to be concerned with who has access to files, but ultimately it rests with the users. It's their system and their information, and they should exercise the proper level of control." Ideally, he says, that will come with time.

Monoco identifies two key issues and says both should be addressed. "Are the software and hardware solutions adequate to provide the level of controls the application demands? And are the users disciplined enough to take advantage of those solutions and know what is secure and what isn't?" he asks.

Perhaps the best example of how murky issues of ownership and control of data can become in shared systems is provided by current events. Lt. Col. Oliver North and his associates thought they had purged their own messages from IBM's Professional Office System (Profs), an intraoffice electronic mail system used by the White House. But congressional investigators found all the Profs notes in a backup file and are using them against North and others in their investigation of the Iran-Contra affair. It's to the political pundits to decide if that's ethical. •

Schneiderman is a free-lance writer based in Bedminster, N.J.

Making disaster recovery for the micro painless

BY BELDON MENKUS

The widespread introduction of microcomputers has created a host of new disaster exposures and recovery problems, most of which are not addressed in existing disaster recovery plans. The typical data processing disaster recovery plan reflects 20-year-old assumptions and is designed only to restore the critical activities carried out in a single-site mainframe data processing facility.

Not all data processing activities undertaken with microcomputers are essential to business operations. A microcomputer used to manage sales or inventory activities in a branch office of a national organization is probably engaged in an essential computing activity. However, a microcomputer used primarily for text processing, electronic mail and remote data base content reference is not likely to be engaged in computing activities whose prompt restoration after a disaster are essential to the organization's recovery.

Insofar as microcomputers are used to carry out essential activities, they are also key elements in the overall disaster recovery process. Even if, for instance, the central data processing site survives a disaster, loss of either telecommunications capabilities or microcomputers at critical locations may reduce the organization's ability to restore essential data processing functions in a timely manner.

In addition, microcomputers may not be consistently configured. The software used may have been modified or even written from scratch by individual end users. And the infinite varieties of this software, along with the files used with it, may not even be backed up on any regular basis. Loss of the original software and files in this environment will mean that everything is lost.

Three-way street

The same risk assessment methods used in preparing a single-site data processing disaster recovery plan should be applied to an organization's microcomputer environment. Normally, there are three microcomputer-related disaster vulnerabilities for which recovery provisions must be made. These involve loss of the hardware itself, software that is unique to the company and data files whose contents are not duplicated elsewhere.

Since microcomputers typically are purchased and not leased, replacements for damaged or destroyed hardware will probably have to be bought from nearby retailer stocks. In situations in which a number of machines must be replaced, it may be necessary to draw upon the stocks of numerous retailers or of one or more distributors, which may result in intolerable delays in restoring essential data handling activities.

The hardware replacement process will be expedited if a single type of microcomputer is used consistently throughout the organization and if limits are placed upon the variety of enhancement and expansion boards used.

Microcomputer software that has been modified locally or obtained without documentation from electronic bulletin boards may prove to be almost impossible to replace in a timely manner. Of course, unduplicated files may be impossible to restore in any fashion. Again, as with microcomputer hardware, requiring the use of readily available commercial software products will help reduce the restoration problem. And modification of these application packages should be discouraged. Finally, regular — at least daily — backing up of unique microcomputer file contents should be required, especially when high-capacity hard disks are in use.

Improving the odds

Several things can be done to ensure that essential microcomputer activities are able to survive a disaster.

First, educate those using microcomputers about the need to conform to the controls described here. Second, arrange to have the organization's internal auditors verify microcomputer user compliance with disaster recovery plan requirements as part of their routine examinations. Third, include microcomputers and their users in the organization's periodic testing of the overall data processing disaster recovery plan.

The rapid growth in reliance upon microcomputers makes it essential that they just as rapidly be made an integral part of every organization's data processing disaster recovery plan. It will be relatively painless to ensure that they are covered by that plan. •

Menkus is an independent information systems development and computer security consultant based in Middleville, N.J. He has been involved in data processing disaster recovery planning for more than 25 years and is the author of *Getting Started in Data Processing Disaster Recovery*, published by the Institute for Management Improvement.

VENDOR VIEWPOINT

Modems and the protection of dial-up communications data

BY FRANCIS BACON

Although network management is the first requisite for all network security, it is even more true for dial-up than for dedicated networks.

Until recently, the phrase "dial-up network" was a contradiction in terms. Traditionally, networks have been thought of as a centrally managed collection of established links that connect several or even many senders and receivers on a more or less permanent basis.

The term "dial-up," on the other hand, conjures up pictures of ad hoc connections between pairs of modems. Modems are connected temporarily by one modem dialing the phone number of another. The modems are then disconnected when their hosts have nothing more to communicate. There is no "network" per se, only independent modem connections using public telephone circuits. Any modem can simply call any other modem in the world that understands its protocol and whose host has been programmed to respond to the caller.

All this is changing with more intelligent modems. It is now entirely possible to impart network-like qualities to temporary connections that utilize the public telephone system. The key difference between the new modems and their predecessors is that they can be programmed to communicate only with certain other modems or classes of modems. In addition, this programming can be changed dynamically from a central point.

In other words, a company can define established, and even exclusive, relationships among various nodes without keeping the links continuously active.

Those relationships can be defined by various link attributes such as data speed, security level, the presence or absence of data compression and who is allowed to talk to whom. Further, these attributes can be controlled and set dynamically from a central host without remote operator intervention.

Of course, public telephone lines are just that — public — which makes them easy targets for information thieves. Many of the security problems inherent in dial-up lines can be solved, however, by making those lines part of a managed network.

The most basic threat to dial-up communications originates from the fact that the only thing standing between a computer and anyone with a telephone is a pair of modems. Historically, the first line of defense against someone calling into a computer and getting information is password protection on the host itself. This is the method of protection with which everyone who dials into a host is most familiar. A second threat is a tap on the telephone line.

Once dialogue occurs between a remote user and a host, it is possible to simply monitor the dialogue using a tap and a third modem. There is nothing to stop someone using a phone tap from monitoring transmitted data or from simply stealing the password needed to gain independent access.

> MANY of the security problems inherent in dial-up lines can be solved by making those lines part of a managed network.

Managed modems — those with built-in management features — can stand up to both of these threats by providing password and callback protection before a connection is even made to the host. Since a remote user must know two passwords — the modem's and the host's — and be located at a predefined telephone number before access is permitted, security is significantly enhanced, while a drain is removed from CPU resources.

In regard to line taps, the managed modems allow for a number of defenses, including data encryption and data compression.

Data encryption means the bit patterns representing the characters are rearranged in an unpredictable way before going out on the line and then are put back together in the proper sequence at the other end. Data compression, which reduces the number of bits needed to represent characters (in order to increase effective line speed) accomplishes very good data encoding as a by-product of compression. In fact, compressed data that is also encrypted is doubly hard to read by unauthorized line intruders. To do so, an intruder must have both the encryption code — set at random and known only to the hardware — and the same modem type as that used by the victim.

Hidden passwords are modem-level passwords that can be defined remotely from a central site with no involvement by those at the modem's location. When a dial connection is established, the modems exchange predefined hidden passwords. Only modems with approved passwords are allowed to communicate with the host. Access is denied at the point of entry to the central-site modem pool rather than at the exit.

Security is management

It is one thing to implement a specific security option in a single modem or pair of modems. It is another to implement a number of options or combinations of options across hundreds of modems in a planned fashion.

Questions like, "Who will talk to whom?" and "At what level of security?" are ones that companies must ask themselves before installing a dial-up network. The actual implementation, however, is very straightforward.

Managed modems are, of course, required. Network configuration is usually performed through a personal computer using high-level commands that directy address intelligence within the modems. Network parameters, including security, are defined from a single site, which has a single unified perspective of the entire network.

What management of a dial-up network really means is defining how modems will respond to other modems that attempt connection. These relationships give users not only the impression but the reality of a network. A big part of these modem relationships is security.

Many companies have delayed implementation of a security system because of historically high costs for security equipment to be used with modems. With the advent of managed modems, complete dial network security can now be installed for the cost of the modem alone.

So what is the relationship between dial-up network management and security? The answer is fundamental: Management makes security possible. •

Bacon is chairman of Telcor Systems Corp., a maker of data compression modems and network management and security products.

Microcomputer security software

COMPANY	PRODUCT	OPERATING SYSTEM(S) REQUIRED	RANDOM-ACCESS MEMORY SIZE REQUIRED	DISK STORAGE REQUIRED	COPY-PROTECTED	NUMBER OF ENCRYPTION/ DECRYPTION ROUTINES	MENU-DRIVEN	DATA COMPRESSION SEPARATE OR BUILT-IN	OVERWRITES ORIGINAL TEXT	PRODUCES PRINTABLE ENCRYPTED FILES	MAXIMUM NUMBER OF KEY CHARACTERS	OFFERS USER-SELECTED KEYS	OFFERS ON-SCREEN ECHO OF KEY	INCLUDES AUDIT-TRAIL FACILITY	WORKS ON LOCAL-AREA NETWORK	PERMITS MICRO-TO-MAINFRAME TRANSFER	TIME AND DATE STAMPING	PRICE
A-O Electronics, Inc. (404) 491-8044	X-Lock 100	Any PC-DOS 2.0 and higher	0	Any	NA	1	Yes	NA	Yes	Yes	8	Yes, choice	Yes	Yes	Yes	Yes	No	$495
	X-Lock 50	PC-DOS, MS-DOS 2.0 and higher	0	Any	NA	1	Yes	NA	Yes	Yes	16	Yes, choice	Yes	No	Yes	Yes	No	$295
Advanced Computer Security Concepts (703) 354-0985	Cryptogard	PC-DOS 2.0 and higher	2K bytes	6K bytes	NA	1	No	NA	Yes	No	—	No	No	No	No	Yes	Yes, purchase option	Contact vendor
Alan Brandt & Co. (212) 673-0337	Cylock	MS-DOS 2.0 and higher	64K, 128K, 256K bytes	300K bytes	No	2	Yes	Built-in	Yes	Yes	8	Yes	No	Yes	Yes	No	Yes	$549
American Computer Securities (a division of Sendex, Inc.) (219) 232-2770	Easylock	MS-DOS 2.0 and higher	68K bytes	47K bytes	No	1	Yes	Built-in	Yes, purchase option	Yes	8	Yes	No	No	Yes	No	No	$98
American Computer Security Industries (619) 695-9220	Comspec II	PC-DOS 2.1, 3.1, 3.2 and compatibles	16K bytes	—	Yes	—	Yes	—	Yes	—	—	—	—	Yes	Yes	Yes	—	From $195
Analytics Communications Systems, Inc. (703) 471-0892	The Personal Computer Security Module	MS-DOS 2.1 and higher	—	File-dependent	Yes	NA	Yes	NA	Yes	Yes	64	No	No	Yes	Yes	Yes	Yes	$1,125
Artisoft, Inc. (602) 327-4305	Bit Tracy DES Encryption	PC-DOS 2.1 and higher	256K bytes	10K bytes	No	2	No	NA	Yes	No	8	Yes	No	No	Yes	Yes	Yes	From $75
Basic Data Systems, Inc. (301) 279-2791	Crypto	PC-DOS 2.1 and compatibles	512K bytes	—	Yes	—	Yes	—	Yes	Yes	—	Yes	—	—	Yes	—	—	$25 (per single user), $500 (for agency or entire bank)
	Crypto MS-DOS filter	MS-DOS 2.0 and higher	20K bytes	20K bytes	No	1	No	NA	Yes, choice	Yes, purchase option	256	Yes	Yes	No	Yes	Yes	No	$25
Boden Associates, Inc. (301) 279-2791	Microsecure Tool Kit	MS-DOS, PC-DOS 2.0 and higher	256K bytes	0	No	2	No	Built-in	Yes	No	16	Yes	No	No	No	No	No	$125
Borland International (408) 438-8400	Superkey: Productivity Booster	MS-DOS, PC-DOS 2.0 and higher	128K bytes	48K bytes	No	2	Yes	NA	Yes	Yes	12	Yes	Yes, asterix only	NA	Yes	No	Yes	$100
Datek Software Associates, Inc. (212) 673-8600	Lock-Up	MS-DOS 2.0 and higher	256K bytes	64 bytes more than normal program	Yes	1	Yes	—	Yes	Yes	250	Yes	No	No	Yes	No	No	$99
Digital Pathways, Inc. (415) 964-0707	Access Key Management	PC-DOS 2.1 and higher	256K bytes	256K bytes	No	16	No	NA	No	Yes	64	Yes	No	Yes	Yes	Yes	Yes	$3,025
Digital Signature (312) 324-6533	Crypt Master	All versions MS-DOS; Unix System V, Release 2 and higher	256K bytes	200K bytes	No	2	Yes, choice	Separate	No	Yes	60	Yes	Yes, purchase option	No	Yes	No	Yes	From $95
Enigma Logic, Inc. (415) 827-5707	PC-Safe (Dynamic Password Access Control)	PC-DOS, MS-DOS 2.0 and higher	64K bytes	Any	No	65,000	Yes	NA	Yes	No	32	Yes	Yes	Yes	Yes	Yes	Yes	$275 or $625
	PC-Safe (Fixed)	PC-DOS, MS-DOS 2.0 and higher	64K bytes	Any	No	65,000	Yes	NA	Yes	No	32	Yes	Yes	Yes	Yes	Yes	Yes	$99
Fischer International Systems Corp. (800) 237-4510	Watchdog PC Security Package	PC-DOS, MS-DOS 2.0 and higher	256K bytes	800K bytes	No	1	Yes	NA	Yes	No	12	No	No	Yes	No	No	No	$295
Flinder Software Laboratories (716) 693-0584	Maglock	PC-DOS, MS-DOS 2.0 and higher	Less than 64K bytes	20 bytes per file secured	No	1	Yes	NA	Yes	No	8	Yes	No	Yes	Yes	No	Yes	$89
Glenco Engineering, Inc. (312) 392-2492	Crypt Library-Programmers' Utility	PC-DOS 1.0 and higher	64K bytes	0	No	—	—	—	Yes, purchase option	No	8 or 16	Yes	Yes, purchase option	Yes, purchase option	Yes, purchase option	Yes, purchase option	Yes, purchase option	$200
Inset Systems, Inc. (800) 828-8088	Xpack	PC-DOS, MS-DOS 2.0 and higher	38K to 40K bytes	File-dependent	No	8[26]	Yes	Built-in	Yes, purchase option	Yes	8	Yes	Yes	No	Yes	Yes	Yes	$49.95
	Inset	PC-DOS, MS-DOS 2.0 and higher	115K, 128K bytes	File-dependent	No	1	Yes	Built-in	No	Yes	8	Yes	For screen encryption only	No	Yes	No	Yes	$99
Isolation Systems Ltd. (800) 387-8706	Isac 2200	MS-DOS 2.0 and higher	Any	Any	No	3	Yes	NA	Yes	Yes	8	Yes	Yes, choice	Yes	Yes	Yes	Yes	$695
Jones Futurex, Inc. (916) 635-3972	Autocrypt	PC-DOS 2.0 and higher	64K bytes	0	No	1	Yes	Built-in	Yes	No	12	No	No	No	Yes	Yes	No	$95
Lattice, Inc. (800) 533-3577	Secretdisk	MS-DOS 2.0 and higher	128K bytes	360K bytes	No	2	No	Built-in	NA	Yes	24	Yes	Yes, purchase option	No	Yes	Yes	No	$120
Linear Systems, Ltd. (204) 783-2228	The Data Cage	PC-DOS 3.0 or higher	256K bytes	360K bytes floppy	No	1	Yes	Separate	No	No	Unltd.	Yes	Yes	No	Yes	Yes	Yes	$374

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.
Research assistance provided by Harold Joseph Highland of Compulit, Inc.

COMPANY	PRODUCT	OPERATING SYSTEM(S) REQUIRED	RANDOM-ACCESS MEMORY SIZE REQUIRED	DISK STORAGE REQUIRED	COPY-PROTECTED	NUMBER OF ENCRYPTION/ DECRYPTION ROUTINES	MENU-DRIVEN	DATA COMPRESSION SEPARATE OR BUILT-IN	OVERWRITES ORIGINAL TEXT	PRODUCES PRINTABLE ENCRYPTED FILES	MAXIMUM NUMBER OF KEY CHARACTERS	OFFERS USER-SELECTED KEYS	OFFERS ON-SCREEN ECHO OF KEY	INCLUDES AUDIT-TRAIL FACILITY	WORKS ON LOCAL-AREA NETWORK	PERMITS MICRO-TO-MAINFRAME TRANSFER	TIME AND DATE STAMPING	PRICE
MCTel, Inc. (215) 879-3819	P/C Privacy	All MS-DOS and PC-DOS, CP/M, OS/2, Macintosh, Apple DOS	16K bytes	16K bytes	No	2	Yes	Separate	Yes	Yes	Unltd.	Yes, purchase option	No	Yes, purchase option	Yes	Yes	Yes	$140
MPPI, Ltd. (312) 998-8401	Cryptlock	All PC-DOS, MS-DOS	8.5K bytes	8.5K bytes	No	1	Yes	Built-in	Yes	No	8	Yes	Yes	No	Yes	No	No	$50
Mycroft Labs, Inc. (904) 562-3939	Crypto-Mite with Message Authentication Code	All MS-DOS, PC-DOS	256K bytes	100K bytes	No	2	Yes	Separate	No	Yes	8 or 16	Yes	Yes	No	Yes	Yes	Yes	$150-$250
Obsidian Computer Systems (415) 839-0101	Super Encryptor II	All MS-DOS	128K bytes	Less than 20K bytes	Yes	2	Yes	Built-in	Yes	Yes	Unltd.	Yes	Yes	No	Yes	Yes	No	$100
	Personal Courier	All MS-DOS	128K bytes	Less than 20K bytes	Yes	2	Yes	Built-in	No	Yes	Unltd.	Yes	Yes	No	Yes	Yes	No	$75
	Corporate Courier	All MS-DOS	128K bytes	Less than 20K bytes	Yes	2	Yes	Built-in	Yes	Yes	Unltd.	Yes	Yes	No	Yes	Yes	No	$125
Prime Factors, Inc. (415) 654-5090	U-Psypher	All MS-DOS, PC-DOS	128K bytes	75K bytes	No	1	Yes	Separate	No	Yes	80	Yes	Yes, purchase option	No	Yes	Yes	Yes, purchase option	Contact vendor
	Descrypt/MS 8088, Z-80, 6502 microprocessor families	Operating system-independent	1K to 4K bytes	NA	No	1	No	Separate	Yes, purchase option	Yes, purchase option	16	Yes	No	No	Yes	Yes	Yes, purchase option	Contact vendor
	Descrypt/C for any C Compiler	Operating system-independent	1K to 4K bytes	NA	No	1	No	Separate	Yes, purchase option	Yes, purchase option	16	Yes	No	No	Yes	Yes	Yes, purchase option	Contact vendor
Qualtec Data Products, Inc. (408) 496-6184	File-Guard	MS-DOS 2.0 and higher	32K bytes	Yes, purchase option	No	1	Yes	Built-in	No	Yes	11	Yes	No	No	Yes	Yes	No	$99
RSA Data Security, Inc. (415) 595-8782	Mailsafe (RSA Digital Signature)	MS-DOS 2.0 and higher	192K bytes	360K bytes	No	1	Yes	Built-in	Yes	Yes	95	Yes	No	No	Yes	Yes	Yes	$250
Secure Systems Technology, Inc. (800) 647-5580	Confidante	All MS-DOS, PC-DOS	12K bytes	30K bytes	No	1	Yes	NA	Yes	No	64	Yes	Yes, purchase option	No	Yes	Yes	Yes	$99
Security Microsystems Consultants (800) 345-7390	Lockit III	MS-DOS, PC-DOS 2.0 and higher	Less than 90K bytes	Application-dependent	No	1 standard, 1 optional	Yes	Yes, purchase option	Yes	Hard-ware-de-pendent	16	Yes	Yes, choice	Yes	Yes	No	No	$50
Sentry Systems, Inc. (816) 471-7472	Stoplock IV	MS-DOS, PC-DOS 3.2 and higher	NA	10M bytes	NA	3	Yes	—	Yes	No	16	Yes	Yes	Yes	Yes	Yes	Yes	$695
Sophco, Inc. (800) 922-3001	Protec	All PC-DOS, MS-DOS	128K bytes	12K bytes	No	2	Yes	NA	Yes	Yes	18	No	Yes	Yes	No	Yes	Yes	$195
Star Gate Technologies, Inc. (800) STARGATE	DEM-1000	PC-DOS, MS-DOS 2.1 and higher	5K to 10K bytes	0	No	1	Yes	NA	No	Yes	56	Yes	No	Yes, limited	Yes	Yes	Yes	$200
Systemate, Inc. (512) 458-6202	Systemate	MS-DOS, PC-DOS 2.0 and higher	0, 2K to 180K bytes	120K bytes	No	11	Yes	NA	Yes, purchase option	No	110	Yes	Yes, purchase option	Yes	Yes	Yes	Yes	$100
	Securemate	MS-DOS, PC-DOS 2.0 and higher, Systemate	0	450K bytes	No	1,611+	Yes	NA	Yes, purchase option	Yes, purchase option	164	Yes	Yes, purchase option	Yes	Yes	Yes	Yes	$175
Tact Technology, Inc. (215) 569-1300	Disksentry	PC-DOS, MS-DOS 2.0 and higher	128K bytes	128K bytes	No	2	Yes	Built-in	Yes	Yes	8 to 100	Yes	Yes	No	—	Yes	Yes	Contact vendor
Thumbscan, Inc. (312) 954-2336	Thumbscan System 301	MS-DOS, PC-DOS 2.1 and higher, Xenix	0, 35K bytes	360K bytes per user	Yes	2	Yes	Built-in	Yes, choice	Yes	NA	Yes, choice	Yes	Yes	Yes	No	Yes	Contact vendor
	Gordian System	MS-DOS, PC-DOS 2.1 and higher, Xenix	0, 35K bytes	360K bytes per user	Yes	2	Yes	Built-in	Yes, choice	Yes	NA	Yes, choice	Yes	Yes	Yes	No	Yes	Contact vendor
Trigram Systems (412) 422-8976	Datasafe	All PC-DOS, MS-DOS except 1.0	64K bytes	64K bytes	No	1	Yes	NA	Yes	No	59 ASCII or 56-bit hex key	Yes	Yes	No	Yes	No	No	$99
United Software Security, Inc. (800) 892-0007	Privacyplus	PC-DOS 1.0 or 2.0 and higher	65K bytes	70K bytes	No	2	Yes	NA	Yes	Yes	32	Yes	Yes	No	Yes	Yes	No	Contact vendor
Winterhalter, Inc. (313) 662-2002	Secure	MS-DOS, PC-DOS 2.0 and higher	128K bytes	300K bytes	No	1	Yes	NA	Yes	No	115	Yes	No	Yes	No	Yes	No	$119.95

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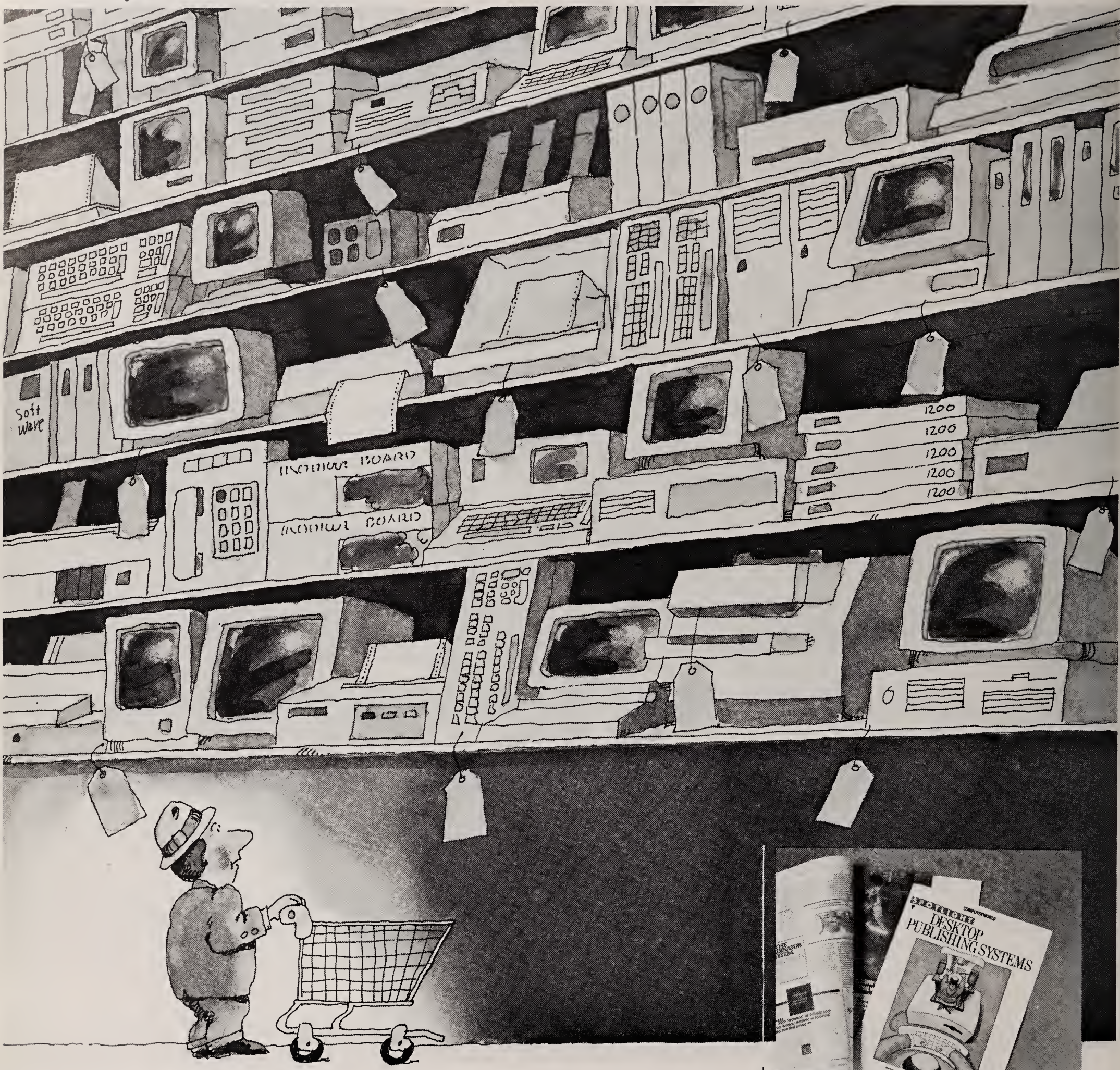

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JULY 19-25

AM/FM International Conference X. Snowmass, Colo., July 20-23 — Contact: Barbara Emery, Automated Mapping/Facilities Management International, Suite 820, 8775 E. Orchard Road, Englewood, Colo. 80111.

The Federal Desktop Publishing Conference and Product Showcase. Washington, D.C., July 20-23 — Contact: FDPC coordinator, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

The Desktop Publishing Conference. Arlington, Va., July 21-22 — Contact: The JLS Group, Inc., 7485 Demille Court, Annandale, Va. 22003.

National Fincom: Financial and Computer Automation Conference. New York, July 22-23 — Contact: Jim Mion, H. A. Bruno, Inc., 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Microtrends '87. New York, July 22-24 — Contact: International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

JULY 26-AUG. 1

Computer Associates International, Inc. Annual User Conference. Orlando, Fla., July 26-31 — Contact: Barbara Peacock, Computer Associates International, 711 Stewart Ave., Garden City, N.Y. 11530.

1987 Summer Computer Simulation Conference. Montreal, July 27-30 — Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

Siggraph '87 — The Fourteenth Annual Conference on Computer Graphics and Interactive Techniques. Anaheim, Calif., July 27-31 — Contact: Conference Management, Smith Bucklin and Associates, Inc., Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

AUG. 2-8

Recognition Technologies Users Association Annual Forum: Remittance and Document Processing. San Francisco, Aug. 2-5 — Contact: Recognition Technologies Users Association, P.O. Box 2016, Manchester Center, Vt. 05255.

25th Annual Conference of the Urban and Regional Information Systems Association. Fort Lauderdale, Fla., Aug. 2-6 — Contact: URISA, 319 C St. S.E., Washington, D.C. 20003.

Resource Access Control Facility Users Conference. Anaheim, Calif., Aug. 3-7 — Contact: Vanguard Integrity Professionals, Suite 109, 1720 E. Garry St., Santa Ana, Calif. 92705.

Desktop Productivity Conference. Boston, Aug. 5-7 — Contact: The Seybold Group, Inc., Suite 100, 100 Homeland Court, San Jose, Calif. 95112.

Extending the Human Mind: Computers in Education. Eugene, Ore., Aug. 6-9 — Contact: University of Oregon Continuation Center, 1553 Moss St., Eugene, Ore. 97403.

AUG. 9-15

Spocade III CAD/CAM Conference. Coeur d'Alene, Idaho, Aug. 9-11 — Contact: Spocad,

E. 502 Boone Ave., Spokane, Wash. 99258.

Very High Performance Engineering Workstations. Bedford, Mass., Aug. 9-11 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

International Computers in Engineering Conference and Exhibition. New York, Aug. 9-13 — Contact: Meetings Department, American Society of Mechanical Engineers, 345 E. 74th St., New York, N.Y. 10017.

2nd Annual Summer Camp for the Information Professional. Bedford, N.H., Aug. 9-14 — Contact: Arnoudse & Ouellette Associates, Inc., #66, 40 S. River Road, Bedford, N.H. 03102.

Computer Art & Design Conference. Chicago, Aug. 10-14. Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

RDB Frontiers '87. Boston, Aug. 10-14 — Contact: The Relational Institute, Suite 106, 6489 Camden Ave., San Jose, Calif. 95120.

Macworld Expo/Boston. Boston, Aug. 11-13 — Contact: World Expositions, Mitch Hall Associates, P.O. Box 860, Westwood, Mass. 02090.

Third Annual Access Technology 20/20 Users' Group Meeting. Boston, Aug. 12-14 — Contact: Access Technology, Inc., 6 Pleasant St., Natick, Mass. 01760.

National Computer Graphics Association's Industry Rountable. San Diego, Aug. 13 — Contact: Barbara Iazzetti, NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

AUG. 16-22

The Tenth Annual McCormack & Dodge User Conference. Chicago, Aug. 16-20 — Contact: M&D, 1225 Worcester Road, Natick, Mass. 01760.

National Computer Graphics Association CAD/CAM '87 Conference and Exposition. Boston, Aug. 17-20 — Contact: NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

1987 International Conference on Parallel Processing. St. Charles, Ill., Aug. 17-21 — Contact: Pheasant Run, P.O. Box 64, St. Charles, Ill. 60174.

AUG. 23-29

Share 69. Chicago, Aug. 23-28 — Contact: Share, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

Tex Users Group's Annual Conference. Seattle, Aug. 24-26 — Contact: Tex Users Group, c/o American Mathematical Society, P.O. Box 9506, Providence, R.I. 02940.

The Omni User Second Annual Technical Conference (on IBM's System/34, 36 and 38). Chicago, Aug. 25 — Contact: The Omni User, P.O. Box A 3031, Chicago, Ill. 60690.

Voice Recognition Applications in Manufacturing. Chicago, Aug. 25-26 — Contact: Nancy A. Loerch, Society of Manufacturing Engineers, One SME Drive, P.O. Box 930, Dearborn, Mich. 48121.

First Conference on Speech Technology in Healthcare. San Francisco, Aug. 26-27 — Contact: Registrar, Institute for Medical Record Economics, 121 Mount Vernon St., Boston, Mass. 02108.

Users' bonds

FROM PAGE 83

come, as MIS tries to maintain control over users and users continue to strive for greater independence.

In the beginning, the high priests of MIS largely controlled corporate computing on the basis of their exclusive command of the technology and the highly centralized nature of early systems.

But this state contained within it some of the seeds of its own decline — chiefly, the development of massive backlogs and an inability, or unwillingness, on the parts of many MIS professionals to understand the needs of end users.

Bigger they are . . .

With the personal computer revolution, users could seize the means of processing for many of their individual needs. Centralized control gave way, depending on the situation, to anything from power sharing between MIS and users to a form of anarchy, with users doing their own things.

This swing of the pendulum ran up against its own constraints, however. Many senior managers realized that they were blowing a significant share of their investments in PCs. Sometimes, the spending was almost totally squandered because the machines simply weren't being used — or were being used for nonproductive purposes like games of *Leather Goddesses of Phobos.*

In other cases, PCs have been put to highly productive use, but their potential hasn't always been reached, due to a lack of standardization, connectivity and integration with corporate systems.

Thus, generally in the past three years, the forces of centralized control have reasserted themselves, establishing standard hardware and software, regulating purchases, installing local networks and forging links — highly controlled links, these forces hope — to corporate data.

Looking ahead for the most part now, this reassertion of control again offers the potential for a reversal. For as the networked PCs gain greater capabilities through developments such as more truly distributed processing and data bases, end users can exert even more influence.

> SOMETIMES PC spending was almost totally squandered because the machines were being used for purposes like games of *Leather Goddesses of Phobos.*

Live bias-free or die

New Hampshire Governor John Sununu, a former technical consultant, suggested the trend when he recently told *Computerworld*, "I'd rather go to the raw, unadulterated data" to avoid bias that creeps in when others summarize it and pass it on.

One can also see in this development the basis for a return swing as increasingly sophisticated corporate networks give MIS organizations more control over the use of the PCs that are tied to it. While top management will most often make the primary responsibility of MIS organizations accommodating the needs of end users, in the interest of efficiency it will also encourage MIS to maintain tight control of the network.

MIS may be responsible for backing up all PCs, regulating their access to the network and off-loading processing and storage to them.

Power to the people

It's important to note that this natural process is going somewhere or, perhaps more accurately, is being taken somewhere. Increasingly, top management is ensuring that users ultimately control information processing because they are the organization's producers.

Steps that senior management is taking to do this include spinning off much of the role of MIS from the corporate staff to line units and appointing former users to head MIS. Bank of Boston Corp., for example, has distributed MIS operations to five divisions in conjunction with a companywide decentralization and has hired a top information systems executive whose experience is in general management rather than information technology.

This drive by management to ensure users' control of information technology has its own natural, driving force — capitalism's guiding principle of survival of the fittest.

Ludlum is *Computerworld's* senior editor, management.

Theses win $10,000

WASHINGTON, D.C. — The International Center for Information Technologies recently awarded three $10,000 prizes in its competition for doctoral dissertations on information systems and technologies.

The winners were: Patricia J. Guinan, an assistant professor at Boston University, for an Indiana University thesis, "Specialist-Generalist Communication Competence: A Field Experiment Investigating the Communication Behavior of Information Systems Development"; David Rung of MCI Communications Corp., for an Oxford University thesis, "Using Telecommunications for Competitive Advantage"; and Veda Storey of the University of Rochester in New York for a University of British Columbia thesis, "An Expert View Creation System for Data Base Design."

INDUSTRY INSIGHT

Jean S. Bozman

Will AT&T hang it up?

The heat is on. Pressure is building inside AT&T's Basking Ridge, N.J., fortress for the telecommunications giant to let go of its four-year dream of becoming a computer vendor.

Sales of AT&T's Model 3B line of minicomputers and Ing. C. Olivetti & Co.-made personal computers are way off, company insiders and industry analysts agree. Not that the 3B family ever made an impact in corporate America — they were installed at a few showcases like Trailways, Inc. in Dallas and at AT&T's own auditor, Coopers & Lybrand in New York. Other than that, the minicomputers made only modest gains as Unix-based office systems.

Olivetti's answers to the IBM Personal Computer proved more popular, but end-user sales through AT&T's sales division also sagged during the last year.

AT&T's Data Systems Division's sales are now so low, sources say, that even modest sales targets set for this year have not been met. Vittorio Cassoni, the Olivetti manager tapped last year to become senior vice-president of the Data Systems Division, is faced with a dilemma. He has a plan to make the division profitable but is running out of time.

The Gartner Group, Inc. in Stamford, Conn., estimates 1986 losses of $700 million to $1 billion at the Data Systems Division. This year's losses will probably top $500 million, Gartner Group analysts said last week. Even for a $34 billion company, those losses are too great to bear.

Spin-off possible?

"They're in a holding action," one analyst said, "and we expect a spin-off of the computer business within the next 12 months." The end may come as soon as this fall, some insiders say.

Lending credence to the immediacy of the problem was a se-

Continued on page 101

Contel-Comsat merger dashed

Telecom firm pursues VSAT market, will buy Equatorial Communications

BY JAMES A. MARTIN
CW STAFF

ATLANTA — After officially terminating a $2.47 billion merger with Communications Satellite Corp. (Comsat), Contel Corp. announced plans last week to acquire Equatorial Communications Co., a satellite communications vendor, as well as two Comsat subsidiaries.

The acquisitions should strengthen Contel's presence in satellite data and voice communications, particularly in very small-aperture terminal (VSAT) services. According to analysts, Contel is seeking to be a broad-based communications supplier, and these acquisitions will help move the company in that direction.

As expected, Contel's merger plans with Comsat were terminated last week. Instead of proceeding with the merger, Contel will buy the Comsat International Communications, Inc. unit and Comsat's VSAT business for $38 million.

Under the merger agreement with Equatorial, Contel will pay $60 million for the company's outstanding shares, 24% of which are currently owned by Martin Marietta Corp.

Under a three-year noncompete agreement and a 10-year joint marketing agreement, Contel has agreed to pay Martin Marietta an additional $12 million to refrain from competing in Equatorial's market. Contel also agreed to purchase some $45 million worth of services from the merged company.

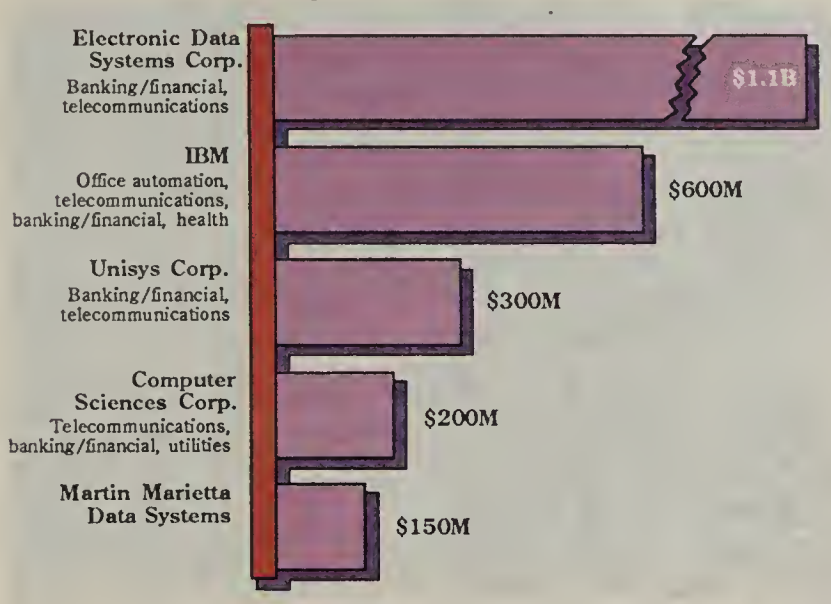
Equatorial, based in Mountain View, Calif., provides satellite data networks for broadcasting and terminal-to-host interactive transaction network applications. The company is

Continued on page 101

Data View

Leading systems integrators

Selected vendors' estimated revenues from systems integration for market and application areas including manufacturing and government, 1986



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CW CHART

3Com sales hit new high

LAN maker reports $31.6M for quarter

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. recently reported record sales of $31.6 million for its fourth quarter ended May 31, a 64% increase over the $19.3 million in sales recorded in the same quarter of fiscal 1986.

The fourth quarter marked the seventh consecutive quarter of sales growth and fourth consecutive quarter of increasing orders for 3Com.

For the full year, sales were

Continued on page 100

European dumping alleged

BY MARIE-MARTINE BUCKENS
IDG NEWS SERVICE

BRUSSELS — The executive commission of the 12-nation European Community (EC) said last week that it has launched a new probe into alleged dumping of dynamic random-access memory (RAM) chips in the European market by Japanese firms.

The latest investigation concerns exports from Fujitsu Ltd., Hitachi Ltd., Mitsubishi Electric Corp., NEC Corp., Toshiba Corp. and Texas Instruments, Inc.'s Japanese subsidiary. The EC announced in April that trade inspectors are already investigating imports of Japanese 64K- and 256K-byte erasable programmable read-only memory chips that are allegedly being sold below cost in Europe.

The new antidumping investigation follows a formal complaint lodged by the European Electronic Component Manufacturers Association, which accounts for all European dynamic RAM production.

Inside

Board maker set to buy Tallgrass

BY ALAN J. RYAN
CW STAFF

TUSTIN, Calif. — CMS Enhancements, Inc., a manufacturer of expansion boards and storage systems for personal computers, announced last week that it has signed a letter of intent to acquire slumping Tallgrass Technologies Corp. in Overland Park, Kan., for an undisclosed amount. Analysts estimated the sale price will be somewhere between $10 million and $17 million.

Tallgrass is a designer and manufacturer of tape backup systems for IBM Personal Computers and compatibles.

Rumors about troubles at Tallgrass surfaced recently when company cofounder David M. Allen, who was chairman and director of research and development, and Emmett W. Johnson, president and chief executive officer, resigned on June 11.

One source said they were asked to leave as a result of the company's weakened market performance [CW, June 22].

"Tallgrass underwent tremendous success and then some downturns over the last few years because of the market they're in," said Lee Elizer, president of Peripheral Strategies, Inc., a data storage consulting and market research firm in Santa Barbara, Calif.

'Attractive acquisition'

But Tallgrass "still has a reasonably good dealer base that would make quite an attractive acquisition for anyone," Elizer added.

Tallgrass's facilities will allow CMS to increase its profits by manufacturing more products itself, rather than buying peripherals from other companies and adding enhancements, said Phil Devin, a senior industry analyst at Dataquest, Inc. in San Jose, Calif.

Devin added that CMS recently opened a new factory facility in Singapore, which brings high-volume, low-cost overseas manufacturing to the company.

The acquisition is subject to the preparation of a definitive agreement and approval of the two boards of directors, according to a prepared announcement.

According to a CMS spokesman, the privately held company was incorporated in 1983 and was later acquired by publicly held Electro Funds Corp. The deal was basically a reverse acquisition, he said, which allowed CMS to become publicly held without going through the usual process.

For its fiscal year ended June 30, 1986, CMS recorded revenue of $41.2 million and earnings of $1 million, or 2 cents per share.

Devin estimated that Tallgrass's current annual revenue will be approximately $20 million.

For its first nine months of fiscal 1987, ended March 31, CMS posted sales of $68.5 million and earnings of $1.4 million, or 3 cents per share. According to a company spokesman, the low profit margin is "not untypical of the industry we are in." CMS employs approximately 140 people.

Corvus cutbacks seen as last-ditch survival move

BY ADAM STONE
CW STAFF

SAN JOSE, Calif. — In what some observers have called a last-ditch effort to keep afloat, Corvus Systems, Inc. recently laid off 25% of its employees, closed all its domestic regional sales offices and announced its intention to abandon direct sales of its IBM-compatible microcomputers.

Still alive, though ailing, the company said it will redirect emphasis toward its local-area network (LAN) products, such as PC/NOS.

Corvus said its new domestic strategy also will depend heavily on distributor and value-added reseller channels for the sale of those products.

Corvus's IBM-compatible personal computer line accounted for about 20% of the company's total sales last year, but that number has been steadily declining, and the profit margin on PCs is low.

Corvus said it expects to show a loss for the fourth quarter, ended June 30, but would not disclose the amount, pending a final audit.

For the first three quarters of fiscal 1987, Corvus reported sales of $42 million and a loss of $9 million.

Questionable future?

After eight straight losing quarters, some industry analysts have expressed serious doubts about the troubled company's future. "They're going down the tubes," said Doug Gold, a senior analyst at International Data Corp. (IDC) in Framingham, Mass.

"My guess would be it's probably one of their last gasps, if not actually their last gasp," Gold said of the recent cuts.

> "THEY HAVE to be pretty close to the bottom of the barrel."
>
> BOB CLARKE
> THE SEYBOLD GROUP, INC.

Recent IDC estimates have indicated that Corvus will ship a mere 0.6% of all IBM-compatible PC LANs in the U.S. this year. "They've slipped out of the group of viable companies shipping a lot of product," Gold said.

Bob Clarke, a former Corvus employee who is currently vice-president of consulting at The Seybold Group, Inc. in Santa Clara, Calif., characterized the recent cuts as "a pretty drastic move. . . . They have to be pretty close to the bottom of the barrel."

Gary Breeding, a Corvus spokesman, estimated that of the 46 people laid off in the most recent round of cutbacks, about 25% held sales and marketing positions. Clarke suggested that the number lies closer to 50% or 60%. "When you lay off the majority of your sales organization, you'd better have another plan," Clarke said. "I don't know what that plan is."

To further complicate Corvus's financial woes, a court ruling came down recently on the alleged default of payment on a $5 million bank loan by KSI Disk Products, a disk component maker of which Corvus owns 50%. The court ruled that KSI's creditor, Union Bank in Los Angeles, may obtain a writ of attachment against Corvus's unsecured assets. Corvus has said it intends to contest the award.

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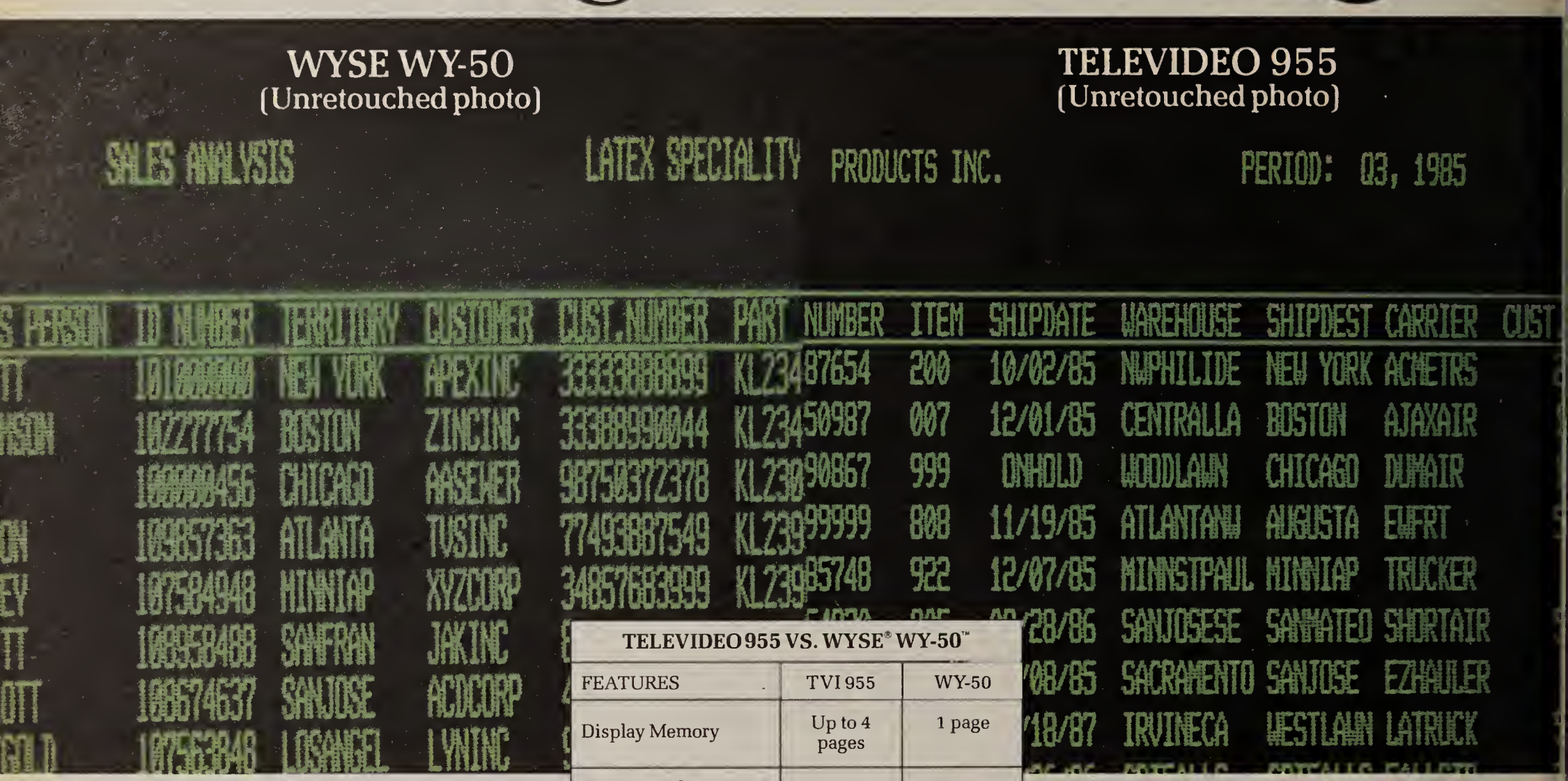

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Another reverse for AT&T-Philips venture

BY AMIEL KORNEL
IDG NEWS SERVICE

PARIS — AT&T recently suffered another setback in its efforts to penetrate Europe's public telecommunications equipment markets. AT&T- Philips Telecommunications BV (APT), its Dutch-based joint venture with Philips N.V. in the Netherlands, lost a bid for a $1.4 billion order from Belgium's national telecommunications authority.

The five-year contract calls for numerical switching and transmission equipment to modernize the country's telecommunications network.

Belgium's Regie des Telephones et Telegraphes said the deal would go to local subsidiaries of French and West German groups: Bell Telephone Manufacturing Co. N.V., the ex-ITT affiliate acquired this year by Cie. General d'Electricite (CGE); and Atea, bought last year by Siemens AG from U.S.-based GTE Corp.

The contract award was the second major setback for APT in three months. In April, APT's hopes of entering the French market were dashed when the government sold nationalized Cie. General des Constructions Telephonique (another ex-ITT affiliate) to a consortium led by Sweden's L. M. Ericsson.

APT has also seen its efforts to enter British and West German markets stymied by persistent pleas for support from Europe's telecommunications industry.

APT officials disclosed in April that they expected the firm, created in 1983, to reach the break-even point in the next fiscal year. But more than three years after its creation, APT has little to show for its efforts.

Meanwhile, the acquisition of the civil telecommunications business of Spain's Marconi Espana SA could turn into a mixed blessing, analysts warn, because of the troubled financial situation at the ailing Spanish firm.

The Spanish deal calls for APT to take control of the civil telecommunications business of Marconi, one of two ITT affiliates acquired by Dutch-based Alcatel N.V., the CGE-controlled telecommunications group created earlier this year.

The Spanish public telecommunications network, with 9.7 million access lines installed by 1985, is the fifth largest in Europe, according to Arthur D. Little, Inc., a Cambridge, Mass.-based market research firm.

But observers warn that Marconi's financial health is far from assured. They note that Spain's state-controlled telecommunications authority, Telefonica, is a sleeping partner in the other Spanish Alcatel affiliate, owning 25% of the firm's capital.

Court OKs NEC petition

BY JAMES A. MARTIN
CW STAFF

MOUNTAIN VIEW, Calif. — NEC Electronics, Inc. has convinced the 9th U.S. Circuit Court of Appeals to consider disqualifying the judge presiding over the NEC-Intel Corp. patent infringement lawsuit.

NEC's petition in the 3-year-old lawsuit resulted from a disclosure by Judge William Ingram that he indirectly owns some $80 worth of Intel common stock through an investment club. NEC filed a motion in November 1986 to disqualify Ingram from presiding over the lawsuit as a result of that disclosure.

NEC said it was delighted with the Court of Appeals' decision to review its plea. Intel officials did not comment.

A Court of Appeals decision to remove Ingram from the case could have "tremendous significance," according to Mel Thomsen, a semiconductor analyst with Dataquest, Inc. in San Jose, Calif. "If that happens, then the earlier ruling by Ingram might not stand, and the case would have to start all over again," Thomsen said.

Regardless of its outcome, the appeals court hearing on Ingram's status will certainly delay the eventual ruling on the merits of the landmark copyright infringement case. Proceedings in the lawsuit will not continue until the matter is resolved.

NEC filed suit in December 1984, seeking a judgment that microcode was not protected under U.S. copyright laws and that the microcode in its V series of microprocessors did not infringe on Intel's copyrights for its 8088 and 8086 chip codes.

Ingram's September 1986 ruling that microcode is copyright-protected was hailed as an industry milestone. Whether or not NEC violated Intel's copyright has yet to be decided in the case, and NEC said it does not want Ingram to continue as judge because of his financial interest, albeit small, in Intel.

Last March, a federal judge denied NEC's motion to disqualify Ingram on the grounds that his financial disclosure "did not establish conscious awareness of the connection between his interest in Intel and the present litigation." NEC appealed that ruling to the appeals court.

MERGERS & ACQUISITIONS

Intelogic Trace, Inc. has agreed to acquire the assets of **Texas Troubleshooters** and other Texas maintenance service contracts from **DP Enterprises, Inc.**, headquartered in Seattle.

Texas Troubleshooters is a Houston-based IBM System/34 and 36 service provider with customers located primarily in Houston, San Antonio and Austin, Texas. In addition to Texas Troubleshooters, DP Enterprises sold all of its maintenance service contract business in Texas to Intelogic Trace.

Cincinnati Bell, Inc. has taken the final step to acquire **Auxton Computer Enterprises, Inc.** in Maitland, Fla.

Auxton provides data processing consulting services, proprietary applications software packages and information processing services to the telecommunications industry. Auxton will operate as a subsidiary of **Cincinnati Bell Information Systems, Inc.**, which is a subsidiary of Cincinnati Bell.

Convergent Technologies, Inc. in San Jose, Calif., and **Bidtek, Inc.** in Portland, Ore., have reached an agreement in principle for Convergent's acquisition of Bidtek, a supplier of a computer-based estimating system for construction firms.

Upon completion of the acquisition, Bidtek will become a part of the Convergent Business Systems subsidiary and should strengthen Convergent's position as a provider of turnkey systems and services to the construction industry.

Neti Technologies, Inc. announced the sale, for more than $4 million, of essentially all the assets and liabilities of its **Huron Leasing, Inc.** subsidiary to a group of investors headed by a former Huron Leasing executive.

Huron Leasing, which sells, leases and services computer hardware, including microcomputers, minicomputers and peripheral equipment, was acquired by Neti Technologies in 1985 for 405,000 shares of the latter's common stock.

French service firms combine

BY JENNY DE MONTAIGNE
IDG NEWS SERVICE

PARIS — Cap Gemini Sogeti SA (CGS) of France, Europe's premier independent software and services company, reportedly has agreed to buy a 36% stake in the Cisi Group, France's No. 2 services firm.

CGS recently signed an agreement with CEA-Industries, the state-controlled firm that owns all Cisi stock, for an undisclosed sum. Observers estimated the deal was worth about $33.3 million.

The alliance of France's two biggest software and services companies should enable both to compete more aggressively for international contracts, value-added networks and facilities-management projects, observers noted.

CGS boasts annual revenue of $483 million and has 6,800 employees, while Cisi has revenue of $255 million and supports a 3,000-member work force.

Observers noted that Cisi has been looking for a financial partner within the industry, while CGS has been eager to accelerate revenue growth and strengthen its international image.

3Com sales

CONTINUED FROM PAGE 95

$110.4 million, 72% above the $64 million earned in fiscal 1986.

3Com attributed the strong sales and orders to its 3System concept, open architecture and recently introduced 3Station diskless workstation.

Flat growth ahead?

However, some analysts are predicting flat growth in revenue for the local-area network maker for at least the current quarter. 3Com may experience a lull in demand during the next three months as its distribution channels evaluate its current software, 3+, vs. its recently announced, but not yet available, 3+Open software, said Alice Bradie, a senior technology analyst with Hambrecht & Quist, Inc.

3Com also faces the risk that users may put off buying 3Com software until 3+Open ships.

But while Bradie predicted that 3Com will realize roughly $31 million in revenue in its first fiscal quarter, she said she expects that for fiscal 1988, 3Com will produce a revenue gain of 31.5%.

Income up 50%

3Com's net income for the fourth quarter was reported at $3.2 million, or 20 cents per share, a 50% rise from $2.1 million, or 15 cents per share, reported in the same period last year.

For the fourth quarter, the company also reported record orders of $30.4 million, a 63% increase over the $18.6 million in orders in the fourth quarter of 1986.

For the year, net income of $11.1 million, or 76 cents per share, was up 67% from the $6.7 million, or 48 cents per share, reported last year.

Orders for fiscal 1987 totaled $111 million, which represented a 68% increase over 1986 orders.

AT&T hang up?

CONTINUED FROM PAGE 95

ries of secret meetings held last month in Italy, near Olivetti's headquarters, and in Basking Ridge, sources said. The reported topic: how to dispose of the Data Systems Division.

Those close to AT&T are unsure whether AT&T will elect to spin off the division or hold it in partnership with Olivetti. They are sure of one thing, though: the bleeding must be stopped.

"There's still a market for the AT&T products," says the director of one Midwestern value-added reseller of AT&T systems. "But the pressure is on within the company for fiscal responsibility."

What AT&T wants — and always wanted — from its computer division, insiders say, is to have its hands on state-of-the-art, very large-scale integration (VLSI) technology. That technology is critical to its switching systems. The Model 3B architecture was derived from AT&T's own switches, and Model 3B20s typically handle 800-number telephone calls.

So, even if end users never fall in love with the Model 3Bs, AT&T cannot afford to jettison them entirely.

A spin-off, analysts say, would continue AT&T's ability to incorporate new breakthroughs in VLSI technology in private-branch exchange switches.

"They need to control their own computer technology," says David Taylor, program director of Office Information Systems at the Gartner Group, "but they don't have to be a computer vendor."

Taylor made no predictions about when, or whether, AT&T would spin off its computer systems group. But he added that Olivetti might like to be able to integrate AT&T's Unix-running 3B series within its own product line in Europe, where Unix-based systems are in high demand.

Will not surrender child

Two weeks ago, when published reports refueled speculation on the spin-off stories, AT&T issued a statement. The company said that it would never think of placing the child of its deregulation up for adoption.

"Computers are an integral part of AT&T's data networking strategy, and the fact is that the results for the first half of the year in our Data Systems Division are on target," the statement said in part.

Bill Patchett, director of product marketing for AT&T's Data Systems Division, broadcasted a similar view in response to media inquiries. "Everything's the way it was," he said, "and we are absolutely going to be announcing new products in the fall."

To informed onlookers, however, it appears that the corporation doth protest too much.

Bozman is *Computerworld's* Midwest correspondent.

Contel-Comsat

CONTINUED FROM PAGE 95

said to be a leading supplier of VSAT services, used in linking point-of-sale terminals, data processing terminals or microcomputers to a host via satellite.

Equatorial's financial results, however, have been awash in red ink. The firm lost $67.7 million in 1986 and reported a loss of $3.3 million in the first 1987 quarter, ended March 29. First-quarter revenue dropped 37% from year-earlier levels to $11.9 million.

Last April, Atlanta-based Contel announced plans to withdraw from the overall Comsat merger as a result of pending Federal Communications Commission actions against Comsat. Several months after the Comsat-Contel merger announcement, the FCC ordered Comsat to refund $62 million to customers because Comsat had earned more after-tax profits than were allowed by FCC regulation.

Comsat is the U.S. representative to an international consortium of countries that provides worldwide telecommunications services via satellite and thus must answer to the FCC.

> "CONTEL wants to be a one-stop shop, and although they have a lot of pieces in place already, they're short in long-haul transmission and fiber optics, as well as in having an international presence."
>
> JEFFREY HELD
> NETWORK STRATEGIES, INC.

The termination of the merger was mutually agreed on and expected.

The resolution to the merger saga was "the best the two could do under the circumstances without totally scuttling the deal," said Jeffrey Held, director of systems integration for Network Strategies, Inc., a communications consulting firm in Fairfax, Va.

"Contel wants to be a one-stop shop, and although they have a lot of pieces in place already, they're short in long-haul transmission and fiber optics, as well as in having an international presence," Held added. Contel spokesman Kenneth Bomar said the acquisition of Comsat's international business unit will strengthen Contel's overseas presence.

Knowing enough to walk away

Avoid disastrous career moves by recognizing telltale signs of danger

BY MICHAEL BALL
SPECIAL TO CW

Sometimes, MIS professionals can easily determine when to say no to a job offer. If they see 10 people trying to work at one terminal or watch the sheriff repossessing the company's furniture while they are waiting for the interview, they know to walk back out the door.

But often the clues are so subtle that professionals — from beginning programmers to veteran managers — miss key warnings. If they do not pay attention, if they do not ask the right questions of the right people, or if they simply ignore the signs, job hunters can easily walk right into career danger and disappointment.

Professionals interested in advancing their careers or starting new ones often find it difficult to remain objective when evaluating possible employers. But a small amount of skepticism can help candidates avoid disaster.

First impressions

"You can learn a lot in the lobby," says Steve McMahan, managing director of Source EDP in Boston. "If everybody's up and happy and enjoying themselves, it is a great sign. If they're not, and the managers treat the people like dirt, you don't want to be there."

Similarly, another recruiter says he finds considerable import in the initial reception. "First impressions are vital," says Lee Walkinshaw, who heads Computer People, Inc.'s Los Angeles office. "If there is a messy reception area or the person who comes to see you is late or badly dressed, you should think badly of the company."

During the first interview, MIS professionals must be alert. What may sound like general information can really constitute the first signs of trouble.

"It's the absolute kiss of death if somebody starts complaining about their employees being lazy or incompetent," McMahan says. "If they do, run like hell as soon as they start telling you everybody else in the shop is a turkey."

As the interview proceeds, a candidate can sense the extent of the work load. "If a company is always way behind schedule and the staff regularly works 60- and 70-hour weeks, forget it," McMahan says. Such conditions indicate understaffing and, in some cases, poor management.

What interviewers do not say is often just as important as the way they describe the company, says Jack Erdlin, president of Management Dimensions, Inc. in Wellesley, Mass. Candidates should be wary if the employer does not offer a tour of the facility or an opportunity to meet potential co-workers. "You have to wonder what the employer is hiding if you don't get to walk through and talk to the other people," Erdlin says. "You can learn a lot from how you are received in the department."

> "IT'S the absolute kiss of death if somebody starts complaining about their employees being lazy or incompetent. If they do, run like hell as soon as they start telling you everybody else in the shop is a turkey."
>
> STEVE MCMAHAN
> SOURCE EDP

Often, warning signs are mixed with positive messages. Candidates can discover the true nature of the job by asking properly timed questions. Yet many MIS professionals often come away from first interviews complaining, "I didn't get enough information to make a decision," Erdlin says.

"People have bad days, interviewers and job seekers alike," he says. "If someone doesn't interview you, you have to interview yourself." Rather than sitting back awaiting questions, candidates should offer details about their background.

Question the interviewer

Likewise, professionals will face a time in the interview when they must ask the tough questions about the position. Such questions should be asked during the second interview or at the end of the first. "Be sure the company is interested in you before you ask," Erdlin says.

At the appropriate time, candidates should ask the following:

- Is the position new, or was the opening caused by someone leaving?
- If it is not new, what happened to the person who held the position, and why did he leave?
- If the position is new, why was no one promoted from within to fill the opening?

Such questions can lead to a discussion of the company's advancement policy and whether it offers an outplacement service.

While many of the warning signs apply to most situations, one professional's concerns may be another's lures. A few years ago, when McMahan left IBM, he interviewed for a position with a company whose data processing staff was composed of ex-Honeywell, Inc. employees. "I knew there would be antipathy in the long run and didn't take the job."

Candidates should define their own set of warning signs, Erdlin says. "If you're used to a private office and you look at a company where there are cubicles or open bays, it might not be the best choice for you," he says.

Armed with mental lists of warning signs, MIS professionals should put companies to a final test by questioning potential co-workers. "Talk with the employees for a while," Erdlin says. "They will open up if you ask them simply what they like and dislike, ask what the boss's strengths and weaknesses are, or better, just ask about the guy's style."

After such questions are answered, the candidate should go back to the interviewer to discover more telling and less obvious information. "Ask about the review period," Erdlin says. "Do you get a real performance appraisal, and does it mean a raise? If they say you're supposed to get one every year, but it is only every 18 months and doesn't mean anything, watch out."

Ball is a free-lance writer based in Boston.

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CBIPO composition, SW maintenance, SMP/E, MVS/XA customization, System library contents, JES2 customization, RMF customization

Experience: Minimum 5 years related IBM experience.

I/O SYSTEMS PROGRAMMER

Major Duties:

Maintain physical I/O configuration, IOCP - generation, DFP installation, Space management

Experience: Minimum 5 years related IBM experience.

General Systems Programmer

Major Duties:

TSO installation, User-id allocation, Catalogue management Library maintenance, ISPF/PDF customization, RACF installation.

Experience: Minimum 5 years related IBM experience

Lead SNA Systems Programmer

Major Duties:

Directions setting, Methodologies generation, Evaluate architectural features, Evaluate product functional content, Design and configure S/W communication systems.

Experience: Minimum 5 - 10 years related IBM-SNA experience

SNA Systems Programmer

Major Duties:

Network naming conventions, Route planning, ACF/VTAM customization, ACF/NCP/VS installation, NETVIEW installation, NCCF customization.

Experience: Minimum 5 years related IBM-SNA experience

CICS/VS Systems Programmer

Major Duties:

CICS/VS customization, DISOSS customization, PS/370 customization

Experience: Minimum 5 years related IBM-CICS experience

Communication S/W specialists

Major Duties:

3725 configurations, 3270 customization, Problem determination tools and techniques utilization, NPDA customization.

Experience: Minimum 5 years related IBM-VTAM/ACF experience.

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Work experience in large IBM-based DP installations for a minimum of 3 years; preferably in major bank.
Capability to transfer experience to the Saudi members of the Bank's team.

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Applications should be sent to:

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SOFTWARE SYSTEMS DEVELOPMENT MANAGER

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This exciting challanges are being faced with a multi-national top-notch work team of experts. The mandate of this team is to build a 1990's system using leading-edge technology.

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Riyad Bank DP environment is an SNA environment with a host MVS/XAO/S and relational data-base; with late 1980's distributed processing and data-base network at the microprocessor level.

This Development Manager will be responsible for

Development of Banking Software Systems using high-level languages and 4-G languages.

Selection of standard Banking Software System and managing the development of the interfaces to Riyad Bank Program Software.

Training the Saudi members in his team.
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Pre-requisites of this position are:

University Degree in related fields.
Strong personality, leadership and dedication.

Extensive SNA exposure.
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Minimum of 20 - 18 years experience in IBM 370 architecture and Software Development.
Minimum of 5 years banking Software experience.
Minimum of 10 years of management supervisory experience.

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The Operations Supervisor to handle the day to day running of Computer room reporting to the Operations Manager.

The Operations Supervisor should have minimum of 4 years computer operations experience in MVS/XA environment and be over 25. Ability to supervise operational team effectively, readiness to work unsocial hours when required and withstand the pressures of a large operational environment are essential qualities.

An attractive starting salary dependent upon qualifications and related experience is offered.

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Online systems experience essential with minimum of 18 months operating MVS/XA Six-day four shifts working week.

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Please send resume and salary history, in confidence, to: **Professional Staffing Department, E. & J. Gallo Winery, P.O. Box 1130, Modesto, CA 95353.**

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Candidates must have a Bachelors Degree in Computer Science or equivalent related degree with a minimum ten years experience including at least five years managing both technical and non-technical staff and five years progressive hands-on technical experience in the management and interaction of programming languages, operating systems, hardware, peripherals, local area networks as related to the maintenance and development of medium to large-scale financial systems in the DEC PDP-11/VAX environment. Strong background in VAX/VMS systems and internals required. Familiarity with DSM-11 and VMS/DMS desirable. New York City residency is also required.

New York City Health and Hospitals Corporation offers a competitive salary and excellent benefits package. If you would like to explore this challenging opportunity, please send your resume with salary history and requirements to:

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Vice President, Information Systems

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WPS is a major group health insurance company and we are currently seeking an Information Systems Professional with 2-3 years COBOL programming experience. Ideal candidate will have programming and analysis experience on a large IBM system, and some exposure to leadership responsibilities. 2 or more years computer science education is preferred.

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Systems Engineer. Analyzes clients' data processing requirements to determine electronic data system that will provide system capabilities for projects or workloads; prepares proposal for system design to accomplish such requirements utilizing all engineering and electronic processing principles and equipment; confers with companys' managerial personnel as necessary to obtain all data needed for the preparation of such systems; follow through on recommended and planned lay-out; perform all necessary engineering services to complete the electronic data processing program; makes necessary modification and suggestions relating to peripheral equipment as needed. 40 hours per week with 5 hours of overtime per week. 8:00 A.M. to 6:00 P.M. $14.55 per hour with overtime paid at the rate of $21.82 per hour. Must have MS in Computer Science and four months experience in the offered position or four months experience as Computer Science Reserach Assistant. Must have had a course in computer design, integrated circuits, software engineering, information, organization and retrieval. Send resume to: Illinois Department of Employment Security, 401 South State Street-3 South, Chicago, IL 60605. Attn: Marie Ninneman. Reference No. 7050-N. An employer paid ad.

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Education and qualifications include: substantial experience as a successful computer user of a multi-user computing facility required; evidence of a genuine interest in helping people solve problems required; ability to work with diverse individuals in a tactful, productive manner required; 4-year college degree required (computer related preferred); experience as a computer user in an academic environment preferred; knowledge of CDC (NOS), Harris (VOS), or UNIX operating systems a plus; **working** knowledge of 2 or more of the following languages a plus: FORTRAN, RPGII, Pascal, COBOL, C, Ada, LISP; familiarity with any of the following packages a plus: SPSS, SAS, HEC1, IMSL, ORACLE, EMACS, Network Mail, WordPerfect, dBaseIII+, R:Base 5000, PC Net.

A letter of application and resume should be sent to: Sally Jarmow, Search Committee Chair, UNS Computing Center, 4505 Maryland Parkway, Las Vegas, NV 89154. Include the names and addresses of at least three professional references.

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Systems Analyst - Determine hardware and software reqs; prep analyses & proposals for devl of computer systems; verify tech specs. Design and implement systems incl superv of EDP stats in installation, maintenance and software design. Detect and correct problem areas. Prep user manuals and improve operating effeciency. B.A. deg in comp. sci, math or engineering & 2 yrs exp in job offered or 2 yrs exp as programmer analyst. Required exp to include wk w/Burroughs mainframe hardware, COBOL, ALGOL, DMS II, GEMCOS & MCP. 40 hr/wk, $35,000/yr. D.O.T. 012167066. No calls. Mail resume to: NYS Job Service, JO#8012945, 247 West 54th Street- 4th Floor, NY, NY 10019.

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NEW YORK CITY HOUSING AUTHORITY PROPOSAL

Sealed Bids will be received by the Housing Authority at the Office of the Systems & Computer Services Dept (Rm 1221), 250 Broadway, NY, NY 10007.

Bids will be publicly opened and read at the time and place stated UNTIL 11 am Friday, July 24, 1987. Bid com002 to be opened at 11:15 AM.

Housing Authority will receive sealed bids for the purchase of the computer equipment listed below. Bids must be submitted on the forms provided by The Authority in the bid documents.

Only Manufacturer will be considered "Responsible Bidders."

BID #com001; 1 CENTRAL PROCESSING UNIT FOR DISTRICT OFFICE USE

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Bid documents may be obtained from Stanley Ferdinand, Assistant Director, Systems & Computer Services Department (Rm 1209) NYC Housing Authority, 250 Broadway, New York, NY 10007.

NEW YORK CITY HOUSING AUTHORITY REQUEST FOR PROPOSAL

The Housing Authority requests proposals from companies to provide persons with computer skills to carry out specific tasks for the Authority.

Copies of the RFP will be made available beginning Wednesday, July 8, 1987 in the offices of the Systems & Computer Services Dept, Rm 1207, 250 Broadway, NY, NY 10007. Responses must be returned not later than the close of business (4:30 PM) on Friday, July 24, 1987. Bids must be submitted on the forms supplied in the RFP package.

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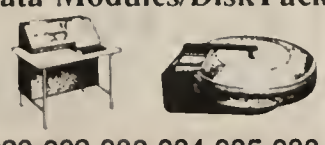

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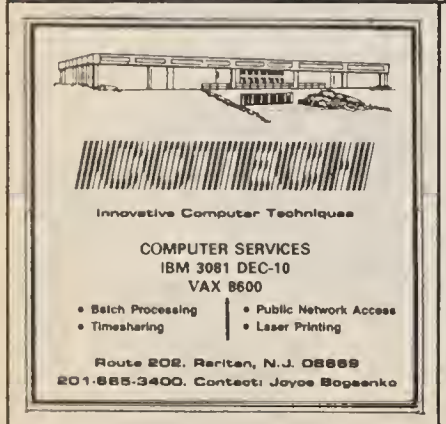

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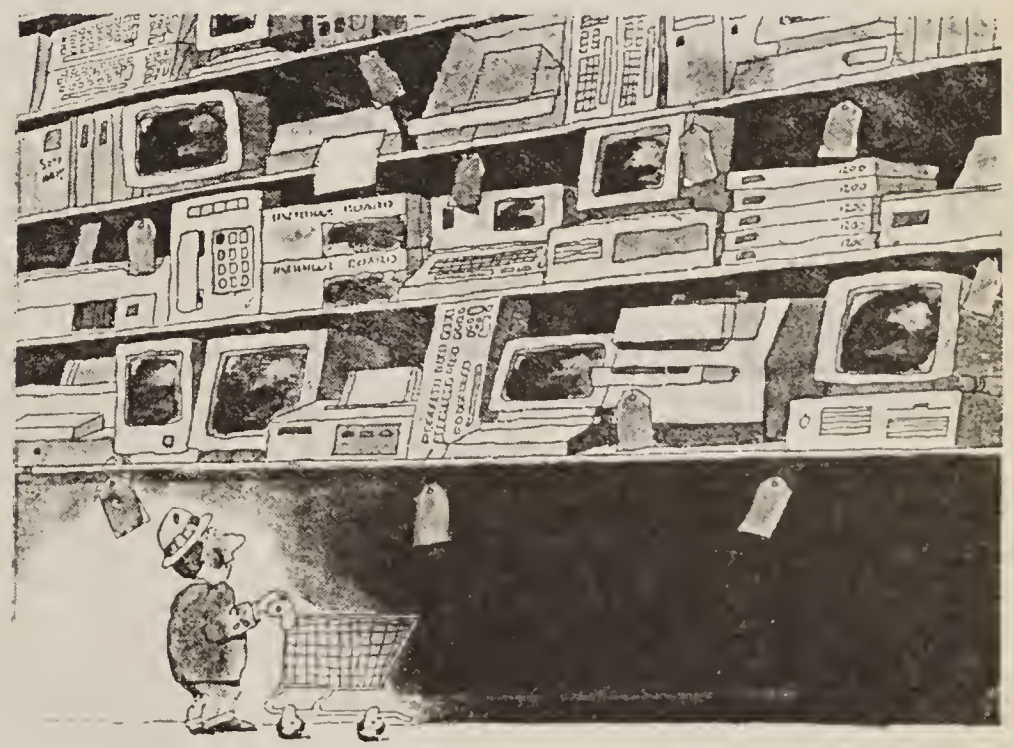

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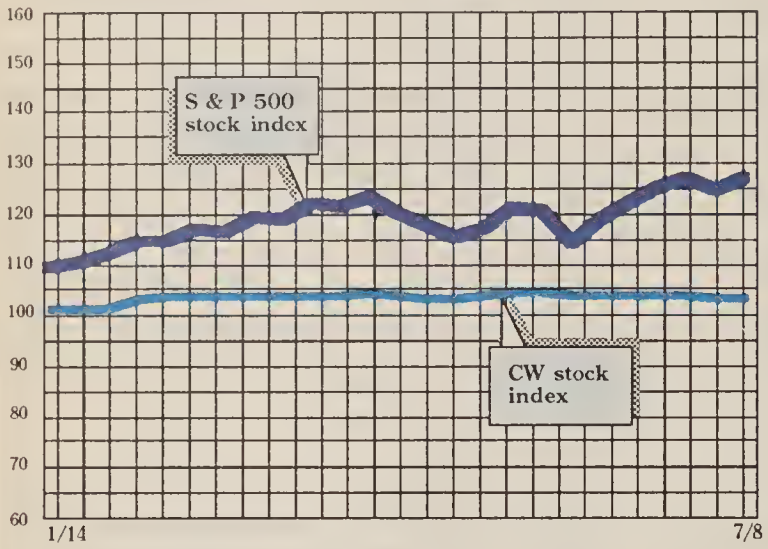
Issue Date	Topic	Ad Closing Date
Aug. 3	Communications Software	July 17
Aug. 10	DBMS for Large & Medium Scale Systems	July 24
Aug. 17	Field Service	July 31
Aug. 24	Education & Training	Aug. 7
Aug. 31	DBMS for Micros & Small Systems	Aug. 14
Sept. 14	DB2 Market	Aug. 28
Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11

STOCK TRADING INDEX



Indexes	*Last Week*	*This Week*
Communications	103.9	**103.4**
Computer Systems	126.8	**122.7**
Software & DP Services	133.1	**130.7**
Semiconductors	113.3	**111.2**
Peripherals & Subsystems	117.0	**115.6**
Leasing Companies	117.6	**120.4**
Composite Index	103.3	**103.1**
S&P 500 Index	124.2	**126.4**

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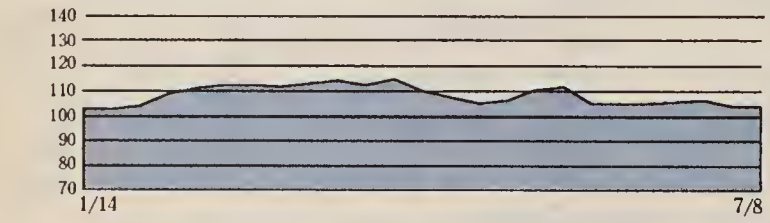

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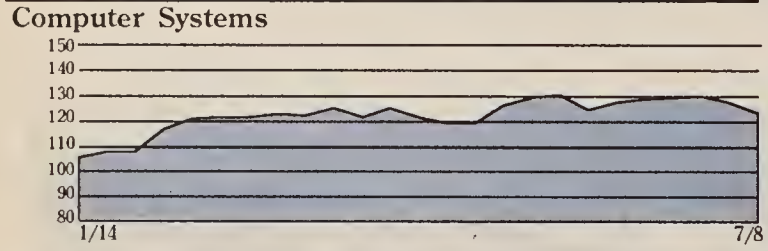

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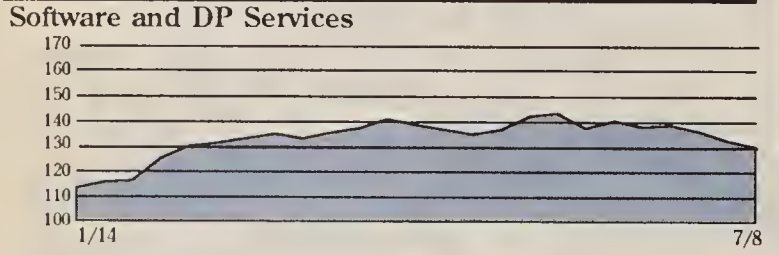

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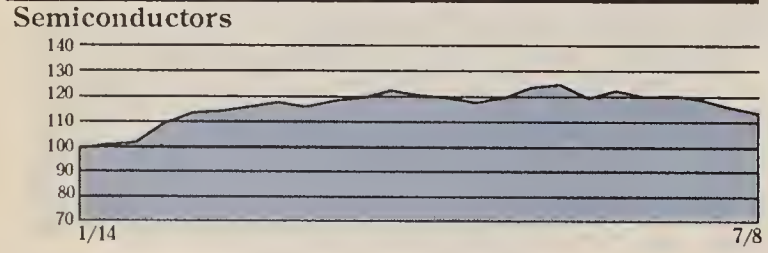

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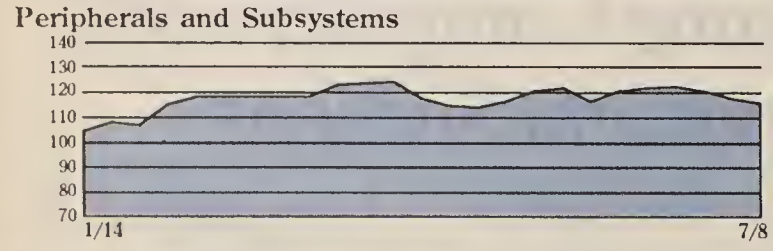

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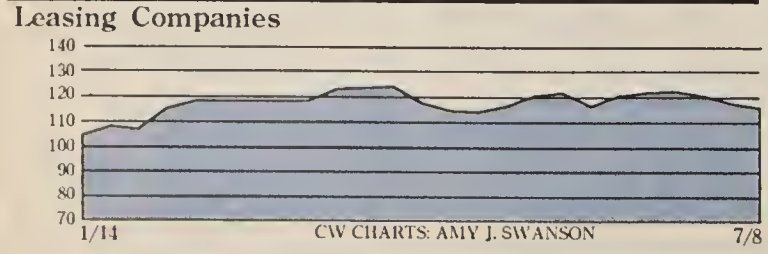

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Q	ANDREW CORP	19	14	15.75	+0.3	+1.6
Q	ARTEL COMM CORP	5	2	3.00	+0.0	+0.0
N	AT&T	30	22	29.25	+D.9	+3.1
Q	AVANT GARDE COMP INC	7	3	3.50	-D.1	-3.4
Q	AVANTEK INC	19	13	14.50	-1.3	-7.9
N	AYDIN CORP	38	18	32.75	-1.5	-4.4
N	8ELL ATLANTIC CORP	77	62	67.75	-0.5	-0.7
N	8ELLSOUTH CORP	46	35	39.25	-1.5	-3.7
Q	8RIOGE COMMUNICATION	27	11	21.88	-D.4	-1.7
Q	COMPRESSION LA8S INC	13	4	4.38	-0.1	-2.8
O	COMPUTER NETWORK TECH	8	4	4.19	+0.2	+4.7
O	CONTEL CORP	35	27	32.88	+0.5	+1.5
Q	DATA SWITCH CORP	9	5	6.88	+0.1	+1.9
Q	OIGITAL COMM ASSOC	49	17	34.50	+0.8	+2.2
Q	DYNATECH CORP	44	27	30.75	-0.3	-0.8
Q	EQUATORIAL COMM CO	7	2	3.63	+0.5	+16.0
Q	GANDALF TECHNOLOGIES	11	5	8.25	+0.1	+1.5
Q	GENERAL DATACOMM INDS	14	8	8.75	-0.9	-9.1
N	GTE CORP	43	34	38.25	-0.3	-0.6
Q	INFOTRON SYS CORP	15	7	9.75	-0.3	-2.5
N	ITT CORP	66	47	60.38	+2.4	+4.1
N	M A COM INC	17	12	14.00	+0.3	+1.8
Q	MCI COMMUNICATIONS CORP	10	5	7.38	+0.0	+0.D
Q	MICOM SYS INC	18	10	11.38	-1.4	-10.8
Q	NETWORK SYS CORP	19	9	9.75	+0.0	+0.0
N	NORTHERN TELECOM LTD	24	13	23.25	+2.3	+10.7
Q	NOVELL INC	27	9	19.75	+0.3	+1.3
N	NYNEX CORP	73	59	67.88	-1.5	-2.2
N	PACIFIC TELESIS GROUP	31	23	25.88	-0.6	-2.4
N	PARADYNE CORP	8	4	6.75	-0.1	-1.8
A	PENRIL CORP	6	4	4.88	+0.3	+5.4
N	PLESSEY PLC	41	24	36.50	-0.5	-1.4
N	SCIENTIFIC ATLANTA INC	2D	9	19.38	-0.1	-0.6
N	SOUTHWESTERN 8ELL CORP	41	33	37.75	-1.1	-2.9
Q	3 COM CORP	24	9	17.50	-1.0	-5.4
N	TIMEPLEX INC	41	14	29.50	-1.0	-3.3
Q	UNGERMANN 8ASS INC	16	7	12.25	-0.1	-1.0
N	U S WEST INC	62	45	52.25	-0.9	-1.6
	Computer Systems					
Q	ALLIANT COMPUTER SYS	37	16	22.00	-6.0	-21.4
Q	ALPHA MICROSYSTEMS	7	3	4.50	+0.0	+0.0
Q	ALTOS COMPUTER SYS	17	10	12.50	-0.1	-1.0
A	AMDAHL CORP	42	16	36.50	+1.3	+3.5
Q	APOLLO COMPUTER INC	25	9	18.13	-1.1	-5.8
Q	APPLE COMPUTER INC	43	15	37.25	-2.8	-6.9
N	8OLT 8ERANEK & NEWMAN	60	37	39.00	-4.6	-10.6
Q	8RITTON LEE INC	5	3	3.13	-0.1	-3.8
N	COMPAQ COMPUTER CORP	51	12	44.75	-1.9	-4.0
Q	COMPUTER AUTOMATION INC	17	2	12.75	-1.3	-8.9
A	COMPUTER CONSOLES INC	12	7	8.88	-0.6	-6.6
Q	CONCURRENT COMP CORP	19	11	17.25	+0.3	+1.5
N	CONTROL DATA CORP OEL	35	20	28.13	-0.3	-0.9
Q	CONVERGENT TECH	12	4	7.13	+0.1	+1.8
Q	CONVEX COMPUTER CORP	22	8	13.88	-1.8	-11.2
N	CRAY RESH INC	136	69	99.13	-2.5	-2.5
Q	DAISY SYS CORP	13	8	8.00	+0.1	+1.6
N	OATA GEN CORP	39	25	30.13	-1.8	-5.5
N	DATAPOINT CORP	9	4	7.0D	+0.5	+7.7
N	DIGITAL EQUIP CORP	175	82	161.13	-3.5	-2.1
N	FLOATING POINT SYS INC	36	8	10.38	+0.8	+7.8
N	GOULO INC	22	15	20.00	+0.3	+1.3
N	HARRIS CORP DEL	43	27	34.25	-2.5	-6.8
N	HEWLETT PACKARD CO	67	36	60.5D	+0.4	+0.6
N	HONEYWELL INC	85	58	80.50	-D.5	-0.6
N	IBM	169	116	166.75	+2.8	+1.7
Q	INFORMATION INTL INC	17	13	13.75	-0.3	-1.8
Q	IPL SYS INC	3	2	2.75	-0.1	-4.3
Q	MASS COMPUTER CORP	10	5	8.38	+0.3	+3.1
N	MATSUSHITA ELEC INDL LTD	159	77	142.75	-9.3	-6.1
Q	MEGADATA CORP	7	2	5.50	-0.3	-4.3
Q	MENTOR GRAPHICS CORP	34	11	25.75	-3.8	-12.7
N	NBI INC	13	8	12.75	+0.6	+5.2
N	NCR CORP	80	42	73.0D	-1.1	-1.5
N	PRIME COMPUTER INC	30	16	25.75	-0.3	-1.0
Q	PYRAMID TECHNOLOGY	12	4	9.00	-0.3	-2.7
Q	STRATUS COMPUTER	41	18	31.75	-2.5	-7.3
Q	SUN MICROSYSTEM INC	46	11	36.88	-5.3	-12.5
Q	SYMBOLICS INC	8	4	3.88	-D.3	-6.1
N	TANDEM COMPUTERS INC	38	14	29.13	-2.9	-9.0
N	TANDY CORP	56	31	41.D0	-1.8	-4.1
N	ULTIMATE CORP	29	13	25.75	-0.9	-3.3
N	UNISYS CORP	128	64	123.5D	+D.1	+0.1
A	WANG LABS INC	19	11	15.63	-0.3	-1.6
	Software & DP Services					
Q	ADVANCED COMP TECH	6	3	4.00	+D.D	+0.0
N	ADVANCED SYS INC	25	12	23.75	-D.9	-3.6
N	AGS COMPUTERS INC	22	8	16.25	-1.0	-5.8
Q	AMERICAN MGMT SYS INC	19	7	15.5D	-1.9	-10.8
Q	AMERICAN SOFTWARE INC	22	7	15.00	+0.5	+3.4
N	ANACOMP INC	9	3	8.25	-0.3	-2.9
Q	ANALYSTS INTL CORP	11	4	8.75	-0.4	-4.1
Q	ASHTON TATE	3D	10	24.75	+0.D	+0.0
Q	ASK COMPUTER SYS INC	17	9	12.50	+0.1	+1.0
Q	AUTODESK INC	285	8	21.00	-4.0	-16.0
N	AUTO DATA PROCESSING	51	29	47.38	-0.1	-0.3
Q	8OOLE & BA88AGE INC	11	4	1D.75	+0.3	+2.4
N	COMPUTER ASSOC INTL INC	29	10	23.50	-1.3	-5.1
Q	COMPUTER HORIZONS CORP	15	1D	12.63	-0.1	-1.0
N	COMPUTER SCIENCES CORP	61	30	55.13	-1.3	-2.2
N	COMPUTER TASK GROUP INC	18	11	12.50	-0.6	-4.8
Q	COMSHARE INC	28	11	25.75	+0.0	+0.0
N	CULLINET SOFTWARE INC	13	6	11.63	+0.0	+0.0
Q	CYCARE SYS INC	14	7	8.63	-0.4	-4.2
Q	DUQUESNE SYS INC	33	12	20.00	-1.8	-8.0
Q	ENOATA INC	12	5	10.88	+0.5	+4.8
N	GENERAL MTRS (CLS E)	46	24	40.88	+2.0	+5.1
Q	HOGAN SYS INC	17	9	13.38	+0.3	+1.9
Q	INFORMIX CORP	23	7	17.25	-1.6	-8.6
Q	INTELLICORP INC	11	4	7.25	+D.0	+0.0
Q	KEANE INC	15	5	8.0D	-1.0	-11.1
Q	LOTUS DEV CORP	37	9	29.25	+0.5	+1.7
Q	MANAGEMENT SCI AMER	21	11	12.13	+0.3	+2.1
Q	MICRO PRO INTL CORP	8	2	5.88	+0.0	+0.0
Q	MICROSOFT CORP	128	26	93.25	-9.3	-9.D
Q	NATIONAL DATA CORP	27	16	23.00	+1.8	+8.2
Q	ON LINE SOFTWARE INTL INC	20	6	16.38	-0.5	-3.0
Q	ORACLE SYS CORP	30	7	21.63	-0.5	-2.3
N	PANSOPHIC SYS INC	23	12	18.88	-0.9	-4.4
Q	POLICY MGMT SYS CORP	30	15	25.00	+0.5	+2.0
Q	PROGRAMMING & SYS INC	13	8	10.25	+0.0	+D.0
Q	REYNOLDS & REYNOLDS CO	42	27	33.00	+0.5	+1.5
Q	SEI CORP	18	8	17.50	+0.5	+2.9
Q	SHARED MED SYS CORP	53	23	27.75	+0.6	+2.3
Q	SOFTWARE AG SYSTEMS INC	20	10	13.38	-0.1	-0.9
Q	SOFTWARE PUBG CORP	17	5	8.75	+0.0	+0.0
A	STERLING SOFTWARE INC	19	9	10.75	-0.1	-1.1
Q	SUNGARD DATA SYS INC	21	10	18.00	-D.3	-1.4
Q	SYSTEMATICS INC	30	14	24.25	-1.5	-5.8
N	UCCEL CORP	45	18	39.00	-1.8	-4.3
N	URS CORP	21	13	17.50	+0.1	+0.7
Q	VM SOFTWARE INC	45	16	22.25	-0.8	-3.3
	Semiconductors					
N	AOV MICRO DEVICES INC	25	13	18.13	-0.6	-3.3
N	ANALOG DEVICES INC	24	14	19.63	+0.4	+1.9
Q	ANALOGIC CORP	13	10	10.88	+D.1	+1.2
Q	INTEL CORP	48	16	43.63	-1.9	-4.1
Q	LSI LOGIC CORP	17	8	9.88	-0.5	-4.8
Q	MONOLITHIC MEMORIES INC	19	10	15.25	-0.8	-4.7
N	MOTOROLA INC	64	34	53.13	-0.4	-0.7
N	NATL SEMICONOUCTOR	17	8	12.75	+0.0	+0.0
N	TEXAS INSTRS INC	68	34	59.75	-0.4	-0.6
A	WESTERN OIGITAL CORP	33	11	24.25	-0.8	-3.0
	Peripherals					
N	AM INTL INC	9	5	7.50	+0.1	+1.7
Q	AST RESH INC	23	11	14.75	+0.8	+5.4
Q	AUTO TROL TECH CORP	9	3	5.88	-0.1	-2.1
Q	8ANCTEC INC	16	6	13.13	+1.0	+8.2
Q	CIPHER OATA PROOS INC	18	9	9.63	-1.4	-12.5
A	COGNITRONICS CORP	5	2	4.25	+D.D	+0.0
N	COMPUGRAPHIC CORP	24	16	23.75	+0.3	+1.1
N	COMPUTERVISION CORP	23	10	15.00	+0.0	+0.0
N	CONRAC CORP	30	12	27.25	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.13	+0.0	+0.0
A	DATARAM CORP	10	7	7.13	-0.1	-1.7
N	OECISION INOS CORP	12	7	10.00	+0.3	+2.6
N	EASTMAN KODAK CO	89	52	87.25	+1.6	+1.9
Q	E M C CORP MASS	34	11	28.50	+0.0	+0.0
Q	EMULEX CORP	10	6	7.50	+0.1	+1.7
Q	EVANS & SUTHERLANO	40	20	33.00	+0.5	+1.5
Q	ICOT CORP	13	5	6.38	-0.4	-5.6
Q	INTERLEAF INC	20	8	16.00	+0.3	+1.6
Q	IOMEGA CORP	12	2	3.50	-0.4	-9.7
Q	LEE DATA CORP	10	5	5.38	-0.1	-2.3
Q	MASSTOR SYS CORP	5	2	4.63	+0.4	+8.8
Q	MAXTOR CORP	34	10	16.88	-2.4	-12.3
Q	MICROPOLIS CORP	44	14	35.00	-0.9	-2.4
Q	MINISCRIBE CORP	18	5	15.13	-1.3	-7.6
N	MINNESOTA MNG & MFG CO	73	50	69.88	+0.0	+0.0
A	MSI OATA CORP	18	10	17.13	-0.4	-2.1
Q	PRIAM CORP	6	2	4.50	-0.1	-2.7
Q	PRINTRONIX INC	14	10	12.50	+0.5	+4.2
N	QMS INC	18	11	15.88	-0.5	-3.1
Q	QUANTUM CORP	35	15	16.38	+D.1	+0.8
Q	RAMTEK CORP	6	4	5.00	-0.1	-1.2
N	RECOGNITION EQUIP INC	27	10	19.88	+0.1	+0.6
Q	REXON INC	14	5	9.38	-0.1	-1.3
Q	SCAN TRON CORP	17	11	12.25	+0.5	+4.3
Q	SEAGATE TECHNOLOGY	46	10	29.50	-3.9	-11.6
N	STORAGE TECH CORP	5	2	3.38	-0.3	-6.9
Q	TANDON CORP	7	2	4.75	-0.4	-7.3
A	TEC INC	7	3	5.13	+0.0	+0.0
N	TEKTRONIX INC	43	27	39.38	+0.8	+1.9
Q	TELEVIDEO SYS INC	3	2	2.63	+0.1	+5.0
N	TELEX CORP	102	52	71.75	+0.3	+0.3
Q	WYSE TECH	35	13	25.50	-2.6	-9.3
N	XEROX CORP	81	49	76.50	-0.1	-0.2
Q	XIDEX CORP	20	11	11.38	-D.1	-1.1
	Leasing Companies					
N	COMOISCO INC	33	15	28.75	-1.4	-4.6
N	CONTINENTAL INFO SYS	14	7	11.88	+0.0	+0.0
Q	PHOENIX AMERN INC	8	3	4.75	+0.5	+11.8
Q	SELECTERM INC	7	5	5.50	+0.3	+4.8
N	U S LEASING INTL	53	38	52.00	+0.D	+0.0

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL; O = OVER-THE-COUNTER; S = SPLIT

O-T-C PRICES ARE 8ID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Tough times

High-tech slide hits small firms hardest; IBM bucks trend

The times are tough for high-tech stocks in general, but smaller companies are being hit the hardest. Some Wall Street gurus are saying that the trend will continue for several more months and that, in effect, the problems creating losses for a few companies have spawned the overall slide.

During the first four days of trading last week, Alliant Computer Corp. dropped from 29¼ to 22½. Sun Microsystems, Inc.'s stock, despite a major announcement, fell 5⅛ points to 37½. Convex Computer Corp. and Apollo Computer, Inc. dropped 2 points to 13½ and 17, respectively. Larger firms feeling the effects of the slide were Compaq Computer Corp., which dropped 1½ points to 44¾, and Digital Equipment Corp., which was down 5⅜ points to 161⅛ on Thursday.

Digital Communications Associates, Inc., whose stock has fallen steadily in recent weeks, was up one-half of a point to 35¼ after reporting strong year-end results.

Firms bucking the losing trend last week included IBM, which was up 2 points to 166¼, and On-Line Software, Inc., which reported a sharp increase and closed at 17¾ on Thursday.

ALAN J. RYAN

Borland

FROM PAGE 1

threat now. It actually makes me less concerned, because Borland is not known in major corporations for high-quality applications," Esber said.

Borland made one previous effort to put a dent in Ashton-Tate's market share when it acquired Reflex — a data base with built-in statistical, analytical and graphics functions — and repriced it from $495 to $99. However, with Reflex, Borland "never did any significant damage to Ashton-Tate," said William Shattuck, a software analyst with Montgomery Securities.

Borland President Philippe Kahn, who called Dbase "old technology," said his firm intends "to make Paradox the standard corporate multiuser data base."

But in addition to Ashton-Tate, Borland will face competition from Lotus, Microsoft Corp., IBM and a host of mini and mainframe software vendors bringing packages down to personal computers.

"Ashton-Tate is the standard now, but with OS/2, you'll have Oracle Corp., Lotus, Microrim, Inc., maybe Microsoft, as well as file managers from Symantec and Software Publishing Corp. Now there's Borland-Ansa. It's really going to be a battleground," said Aaron Goldberg, a vice-president at International Data Corp.

"I don't think there is room for a third standard," said Bruce Johnston, an analyst with First Boston Corp. "The only place where it could be a concern is if it was priced at $99. That would be the only place they could mess up Ashton-Tate."

Developers key

The key strength of the Borland-Ansa combination may lie in its developers. With Adam Bosworth, a Reflex developer, and Richard Schwartz and Rob Shostak, both Paradox authors, Borland has "one of the best collections of data base talents in the industry," said Adam Green, a Lexington, Mass.-based Dbase consultant. "Data bases are where Lotus and Microsoft have never gone before. I would stack Bosworth, Shostak and Schwartz against those companies."

For the near term, however, the battle is largely with Ashton-Tate. Analysts generally agreed that the acquisition strengthens Paradox, but they disagreed on whether Ashton-Tate will be affected.

Paradox users contacted last week said they were pleased with the acquisition. Some users said they believe Ansa's sales have suffered from the firm's small size. "Some people have expressed concern that Ansa is a start-up company. With Borland's resources behind it, it makes Paradox more attractive," said Steve Owens, national microcomputer coordinator for Price Waterhouse in Chicago.

For user Greg Salcedo, the biggest plus is the addition of Ben Rosen, a venture capitalist who helped launch Ansa, to Borland's board of directors. "The Rosen connection made a difference to our senior management when choosing Paradox," said Salcedo, manager of research and development for the financial division of American Savings & Loan Associates in Stockton, Calif.

Expect enhancements

Users said they are also looking forward to expected product enhancements, particulary the addition of Reflex as a front end to Paradox and the inclusion of conventional programming languages — especially C — as development tools. "A lot of users have asked if it is possible to write routines outside of [Ansa's] PAL. That interface really isn't there yet," Owens said.

"If we had an easier way to interface C, you could, for example, create spreadsheet functions that link to the data base, and it would be dynamite," Salcedo said.

Under terms of the transaction, which is expected to be completed next month pending shareholder approval, Ansa shareholders will receive a 13.5% interest in Borland. Borland is now valued at approximately $280 million.

Bells' enhanced service plans stall

BY ELISABETH HORWITT
CW STAFF

The Federal Communications Commission's Comparably Efficient Interconnection (CEI) plan, designed to pave the way for enhanced service offerings from the regional Bell holding companies, may involve too many regulatory potholes to fulfill its function before it becomes obsolete early next year, recent events have indicated.

Last week, Pacific Telesis Group became the second regional holding company to file an enhanced telecommunications service offering under CEI, proposing a voice-mail service that would allow users to access voice mailboxes from Touch-Tone telephones.

This week, Bell Atlantic Corp. will find out whether the Department of Justice has withdrawn its objections to the company's own CEI plan, which was filed last March. Bell Atlantic's proposed service would provide facilities for the voice equivalent of a bulletin board, company spokeswoman Patricia Riley said, in which users would access the same voice message by dialing a given number.

The FCC proposed CEI as a way to allow the Bell operating companies to get into enhanced-service markets while ensuring that they could not use their monopoly of the local telephone network to squeeze out competitors. With each enhanced service tariff, the regional carriers must file a CEI plan showing how they will ensure that a competitor will get the same access to their telecommunications facilities as they provide to their own enhanced services.

CEI is being used as a stopgap until next February, when the Bell operating companies must file the more comprehensive Open Network Architecture (ONA) plans for providing basic service elements to enhanced services providers.

No rush so far

So far, however, there has been no rush on the part of the operating companies to jump on the CEI bandwagon — although Bell South Corp. is rumored to be readying a CEI plan of its own. "We stuck our head out and the rest of the Bell companies have been sitting on the fence, waiting to see how it turns out," Bell Atlantic's Riley said. If so, the other firms may feel discouraged; Bell Atlantic has spent four months trying to get its filing past the regulatory Cerberus represented by the FCC, the Justice Department and enhanced service providers that have offered comments on its proposal.

"We had to get approval from both sides," Riley said. "The FCC says, 'It's an enhanced service so you have to file a CEI plan'; the Department of Justice says, 'It's an information service, which is forbidden under the Modified Final Judgment — so you need a waiver from us.' "

Pacific Bell said it has taken a lesson from Bell Atlantic's experiences. "Their filing was fairly short; ours is a very detailed service," said the company's director of marketing, Heidi Harris.

The next step will be to issue the CEI plan for public comment, followed by a period for the regional carrier to reply to public comments.

Pacific Bell said it hopes to get a waiver from the Department of Justice by September or October and FCC approval within four months. "You would think [the two regulatory bodies] would have an incentive to approve CEI plans, since they put CEI out to allow us to provide enhanced services before ONA is implemented," Harris said.

Consolidate to conquer latest supplier tack

BY CLINTON WILDER
CW STAFF

Two companies that in 1985 each heralded themselves as the next potential Lotus Development Corp. moved last week to solidify their positions as second-tier suppliers of microcomputer software to the corporate marketplace, while a third is trying to raise cash with a low-priced public offering.

Ansa Software's buy-out by Borland International, Symantec Corp.'s acquisition of Living Videotext, Inc. and Javelin Software Corp.'s initial public offering all demonstrated the vendors' needs for strategic partners and solid financial resources in a maturing and consolidating marketplace.

The three different business directions mapped by the firms provided further evidence that start-up firms can no longer ride a single product, such as Lotus's 1-2-3 or Ashton-Tate's Dbase series, to the top of the industry.

Strengthens position

But through acquisitions and partnerships, firms like Ansa and Symantec can strengthen their positions as smaller, but established, vendors of multiple microcomputer products to the MIS community.

Ansa, for example, said it will combine its well-regarded Paradox data base technology with Borland's aggressive marketing, which pioneered the concept of business software priced below $100 (see story page 1).

"The announcements show how difficult it is for new companies to challenge the market leaders," said William Shattuck, software analyst for Montgomery Securities in San Francisco. "I'm not saying they can't succeed, but even companies with great, exciting products find they just can't get on dealer shelves. It's hard to compete on the basis of a frontal attack with the established leaders."

'The Fat Five'

"You can't count on being a single-product company to be in the top tiers," said Aaron Goldberg, a vice-president at International Data Corp. (IDC) in Framingham, Mass. "But through acquisitions, the Big Three may become the Fat Five."

Cupertino, Calif.-based Symantec, with its second major acquisition in five months, staked its first significant claim to the Apple Computer, Inc. Macintosh software market. Mountain View, Calif.-based Living Videotext's key product is More, a presentation graphics package for the Mac.

Symantec, best known for Q&A, its IBM Personal Computer file management software, may incorporate Macintosh features in future Microsoft Corp. MS-DOS or MS OS/2 products, analysts said. "The next generation of PCs is going to look a lot like the Mac," said Jeffrey Tarter, editor of "Softletter," an industry newsletter in Cambridge, Mass. "An amazing number of Mac features, like pull-down windows, are finding their way into PC programs."

Avoided assault

Earlier this year, Symantec acquired Breakthrough Software Corp., developer of Time Line, a project management program for the IBM PC [CW, Feb. 2]. "Symantec may have the best chance to be a viable software publisher, because they have avoided a frontal assualt on a market leader and grown by acquisition," Shattuck said.

> "I'M NOT saying they can't succeed, but even companies with great, exciting products find they just can't get on dealer shelves."
>
> WILLIAM SHATTUCK
> MONTGOMERY SECURITIES

Living Videotext will retain its name and its president, Dave Winer, and will run as an independent division of Symantec.

Winer joins Symantec Chairman Vern Raburn and President Gordon Eubanks to forge a highly talented management team, IDC's Goldberg said.

"The biggest limitation for most companies in this business is the lack of good people running them," Goldberg said. "Both Symantec and Borland have brought a lot of good people together."

Javelin's initial public offering, intended to raise between $4.9 million and $6.5 million, was quietly announced July 2 and is being underwritten by James J. Duane & Co., a regional investment firm based in New York.

Most analysts said they believe the $6- to $8-per-share offering is essentially a fund-raising move. The Cambridge-based start-up has failed to find a winning market strategy for its financial analysis software.

"They're barely large enough at this point to be going public," Shattuck said. "They've been banging their heads against the wall going against Lotus."

IBM expert program afforded product status

BY CHARLES BABCOCK
CW STAFF

RYE BROOK, N.Y. — IBM recently upgraded its expert system development product from an introductory program offering to a full-fledged product capable of accessing the firm's relational data base management systems.

The enhancements to Expert System Environment (ESE), announced a year ago for IBM's MVS operating system, were made close to next week's American Association for Artificial Intelligence conference in Seattle.

"IBM promised last year it would do something in AI, and now they can say they have. They have switched the status of their product," said Harvey Newquist, editor of "AI Trends," a Scottsdale, Ariz.-based newsletter.

Three-pronged system

ESE consists of three components: an expert system shell, using either forward or backward chaining; rules-based reasoning, called the Expert System Development Environment; and a framework for providing the end-user dialogue with the system, called the Expert System Consultation Environment.

Newquist said he does not know how widely used ESE has become during its status as a program offering but said that even as a product, IBM uses it as an incentive to demonstrate interest in an emerging technology and keep customers from going to Cullinet Software, Inc. or Aion Corp., which offer their own expert system development packages.

ESE, set to be available in October, will cost $42,500, or a monthly license fee of $2,360. The Consultation Environment alone will cost $7,500, or a monthly license charge of $415. As an IBM Solutionpac, it is priced at $57,500, including training and consulting services.

IBM is also offering a mainframe version of Common LISP Application Environment, priced at $10,000 or a monthly license charge of $500, and Common LISP Development Environment, priced at $22,000 or $1,100 a month.

The products are scheduled to be available in March 1988.

Ashton-Tate

FROM PAGE 1

color graphics, an Intel 80286-based machine and at least 512K bytes of RAM.

Ashton-Tate's low-end strategy "fills a significant niche in the market," said Craig Cline, associate editor of the "Seybold Report on Desktop Publishing," a newsletter based in Malibu, Calif. "Up till now, you had a choice: either simple word processing or moving up to [Aldus's] Pagemaker, which requires a high level of expertise," Cline said.

Ashton-Tate also opted to compete in the IBM Personal Computer and compatible market, which analysts view as having higher growth in desktop publishing than Apple Computer, Inc.'s Macintosh.

While Byline reportedly was designed for desktop publishing novices, it has drawn criticism from some observers as being too difficult to use.

"It will get eaten alive," said one analyst briefed by Ashton-Tate. The analyst, who asked not to be identified, said Byline does not stack up against most vendors' full-featured desktop publishing packages.

A key concern is the product's lack of what-you-see-is-what-you-get capability, which allows a user to preview on-screen exactly what will appear in printed output. Byline also uses pull-down menus rather than the familiar icons employed on most publishing packages.

However, the product reportedly contains at least one key feature that should appeal to a large base of PC users. Byline can import files from a variety of programs, including Apple's Macpaint and Macwrite; Ashton-Tate's Dbase and Multimate; Lotus Development Corp.'s 1-2-3; and most popular IBM PC-based graphics programs.

Byline is based on technology Ashton-Tate acquired from Skisoft, Inc., a Lexington, Mass.-based software development firm.

Although Skisoft President Ken Skier declined to reveal specifics, he confirmed that the package would run on the installed base of IBM PCs and compatibles, including 8088-based machines.

According to Skier, Byline is aimed at users whose desktop publishing needs do not justify an investment in new hardware. "If you are preparing a spreadsheet with Lotus and would like your stuff to be much more beautiful, you don't need a 386 with an Adobe Systems, Inc. Postscript printer," he said.

CORRECTIONS

The Copal U.S.A., Inc. Write Hand series of dot matrix printers [Spotlight, June 22] is priced from $349 to $1,145.

A U.S. Department of Justice official last week stressed that the department has not reached any preliminary conclusion regarding the proposed merger between Computer Associates International, Inc. and Uccel Corp. He said the department is considering verbal testimonies from competitors and customers as a matter of routine procedure [CW, June 29].

Xenix 386 is distributed by Santa Cruz Operation; Microport Systems, Inc. distributes Unix 386 [CW, July 6].

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INSIDE LINES

The good, the bad and the not-so-ugly. The bad news is IBM representatives' reaffirmation for high-end System/38 customers that the first deliveries they will see of the successor to the System/36 and 38 — code-named Silverlake — will be in late 1988. When they asked if they should wait for Silverlake or a new high-end System/38, the users were recently told to buy more System/38 Model 700s. Better news was that the high-end Silverlake model will provide twice the power of a Model 700. The good news for other IBM customers is that 36 and low-end 38 users may see Silverlake models in their performance range months before the high-end models arrive. In related moves, IBM will reportedly move RPG III under its System Applications Architecture within a year and enhance the System/38's CPF operating system with an SQL-type function allowing update access to multiple data bases as if they were one data base.

President has to sign off. Several months ago, a London resident received an International Computer Program (ICP) plaque recognizing that his software company's product had achieved $5 million in sales the year it was introduced. Both the company, Consoft, and the product, DBXV, were fabricated by Guy Kewney, a British free-lance writer, who wanted to make the point that anyone willing to fill out two pages of forms could get an ICP award. The awards, which have been given out for 16 years, recognize software products that achieve $1 million in sales their first year and, at regular revenue levels, up to $250 million in succeeding years. ICP officials acknowledge they are dependent on the word of applicants and that they require the signature of the president and chief executive officer of a company along with either the firm's accountant or chief financial officer. Kewney said the only call he received asked him if he would like to advertise in an ICP publication.

The enterprise. Microsoft and Excelan are discussing a strategic alliance centered around Excelan's Transport Control Protocol/Internet Protocol expertise. Products from 3Com Corp., Microsoft's partner in LAN Manager development, use a competing protocol, Xerox's Network Systems. Discussions between Microsoft and Excelan are progressing nicely, according to Excelan Vice-President Subash Bal. If all goes well, look for an announcement soon.

Second channel. Another report wafting across the country concerns the upcoming — and next major — announcement from Compaq. Sources say the announcement, scheduled to take place by summer's end, concerns Compaq's multiuser strategy — either Unix- or networking-based. Meanwhile, back at the ranch, Compaq is hard at work on a Micro Channel project, making it appear that Compaq doth protest too much.

Clear to the operatives. Apple's recently formed software subsidiary last week was named "Claris," a contraction of clarity and distinctiveness, according to subsidiary President William V. Campbell, who tapped Metaphor Computer Systems co-founder Yogan Dalal as vice-president of product development.

No fall guy. Microsoft Chairman Bill Gates revealed that a version of the Presentation Manager will ship to developers this year. Speculation that OS/2, and the Presentation Manager in particular, were slipping completion dates recently prompted IBM Engineering Systems Division chieftain Bill Lowe to pronounce the Presentation Manager as being possibly ahead of schedule, although he would not say what that schedule was.

The first shipment. July is nearly half gone, and 9370 Models 20 and 60 have not yet begun volume shipments, according to an IBM spokesman. But the mid-range processors are still slated to move off the loading docks and onto trucks bound for customers before the month is out, the spokesman said. One software developer who has been working with the machines suggested IBM could be making some last-minute changes to DOS VSE/SP 3.1 and CICS 1.7, both new versions that are to be shipped with the long-anticipated boxes.

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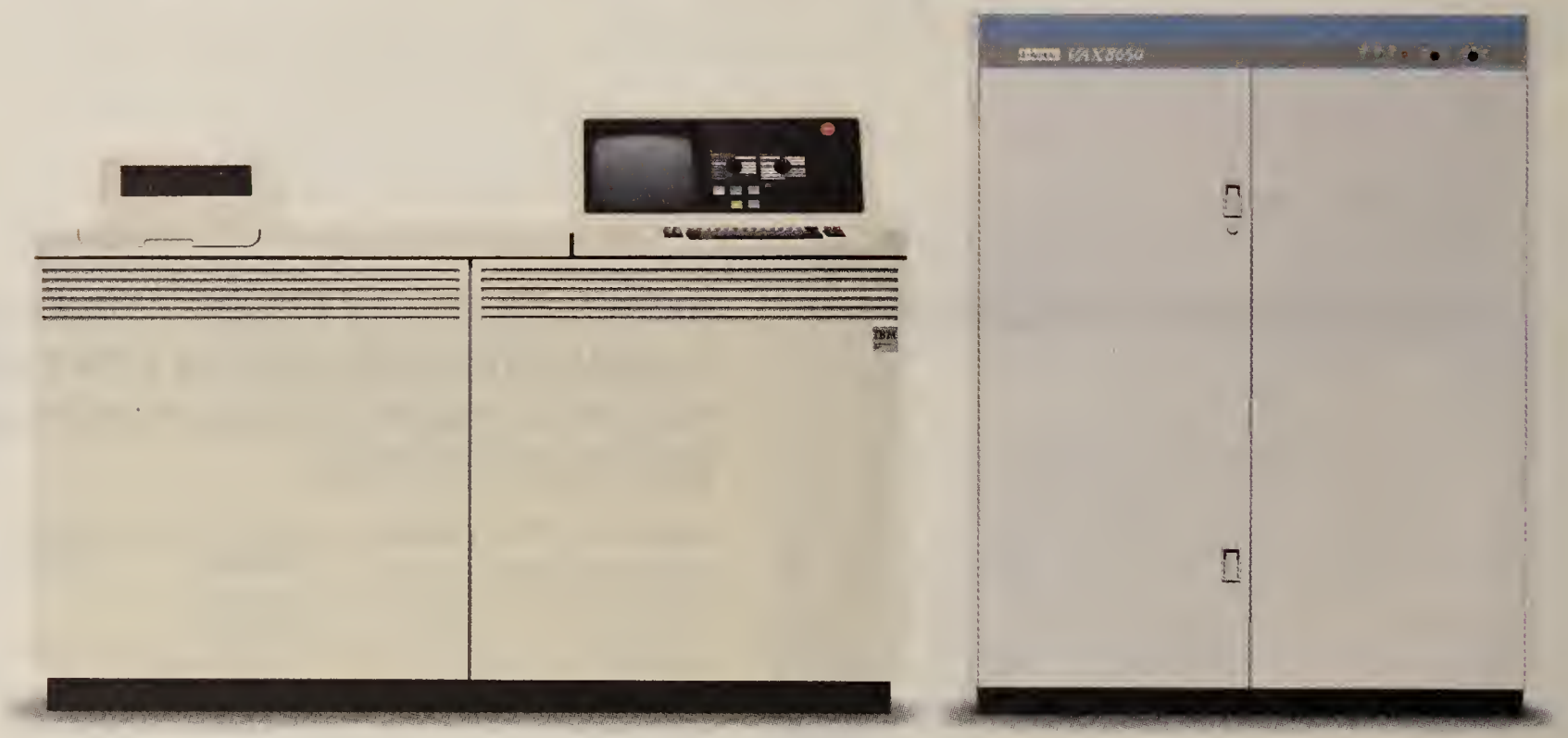

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